A Radical and Expeditious

# CURE

FOR A RECENT

CATARRHOUS COUGH.

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# CATARRHOUS COUGH.

PRECEDED BY
Some Obſervations on RESPIRATION;
with Occaſional and Practical Remarks
on ſome other Diſeaſes of the Lungs.

To which is added a CHAPTER
## On the VIS VITÆ,
So far as it is concerned in Preſerving and
Reinſtating the Health of an ANIMAL.

Accompanied with
Some STRICTURES on the Treatment of
COMPOUND FRACTURES.

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By JOHN MUDGE, F.R.S.
SURGEON at PLYMOUTH.

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TO

Sir JOHN PRINGLE, Bart.

Physician to the QUEEN,

AND

President of the ROYAL SOCIETY,
&c. &c. &c.

SIR,

I HAVE long, and very earneſtly, wiſhed to expreſs the ſenſe I entertain of the many diſtinguiſhed inſtances of friendſhip and eſteem which you have been pleaſed to confer upon me. The additional honour, therefore, which the permiſſion of prefixing your name to the following tracts has done me, gives me the greateſt ſatisfaction: not, Sir, that I have the vanity to think their merits have much pretenſion to your notice; nor, on the other hand, any apprehenſion that your obliging patronage can expoſe you to diſhonour from their defects;

but, as profound abilities in ſcience, founded on the baſis of *Probity* and *Virtue*, muſt ever render a character ſplendid and reſpectable, I ſhall always eſteem it an honour to have been able, thus publicly, to ſubſcribe myſelf

SIR JOHN PRINGLE's

Much obliged

And affectionate

Humble Servant,

JOHN MUDGE.

## THE

# PREFACE.

EVERY medical diſcovery has certainly a claim to the public attention: for though, on a ſuperficial view, the diſeaſe ſhould ſeem ſlight, or the treatment trifling, yet, when we reflect that the welfare of the great body of mankind is concerned, deriving conſequences from that conſideration, it ſwells into importance.

Indeed, as the aggregate or great maſs of phyſical, as well as every other ſpecies of knowledge poſſeſſed by mankind, muſt be the reſult of the communicated experience of individuals, ſo it becomes the duty of each to impart, in this experimental traffic, ſuch treaſure as he ſhall have gathered towards the increaſe of the public ſtock; and there is great reaſon to ſuppoſe, if this had been ſimply and faithfully obſerved, that though the greater part had contributed their mite only, yet, ſuppoſing even that to have been ſterling, the capital would have been much larger than the world is at preſent poſſeſſed of.

It was, no doubt, from this idea, that Dr. Sydenham was not aſhamed to ſay, if his whole life had been employed, provided he had at laſt ſucceeded, in the diſcovery of an effectual remedy even for the cure of corns, he ſhould have thought his time had been employed to a good purpoſe, and that he had deſerved well from the Public. On this conſideration, therefore, I might reſt my apology for the preſent intruſion, was the diſcovery of the cure for the Catarrhous Cough, or that diſtreſſing affection of the trachea and lungs, upon taking cold, of much leſs importance to health and life than in fact it is. But, on the contrary, thoſe complaints of the breaſt frequently become diſeaſes truly formidable to tender conſtitutions, inaſmuch as, from their delicacy, they are not only extremely obnoxious to the ill impreſſions of cold, but the lungs themſelves, in this conſtitutional feebleneſs, at the ſame time that they can leſs bear the convulſive agitations of an importunate cough, are alſo, from their tender ſubſtance and delicate order of veſſels, more ſubject to be injured by pituitous matter made acrid by a long lodgement in the extreme branches of the bronchiæ. Very fair people, with delicate complexions and vermilion cheeks, eſpecially if under the influence of hereditary impreſſions; and thin lean habits, with hollow temples and high cheek bones, where the *cartilago ſcutiformis*, the laſt vertebra of the neck, and the proceſſes of the *os ſacrum*, are found remarkably prominent, are more particularly expoſed to hectic complaints;* and in both theſe Catarrhous Coughs are really dangerous, and often lay the foundation of a pulmonary phthiſis.

Upon the whole; if the remedy here propoſed, when early applied and properly directed, (for on both theſe its ſucceſs intirely depends) ſhall be found effectual, it will immediately and radically cure a complaint very troubleſome and fatiguing, as it frequently harraſſes the patient ſome weeks; and if, moreover, we examine the bills of mortality, and there ſee the numbers who are annually ſwept off by conſumptions; or if, from phyſical experience, we remark how greatly this diſorder ſwells the catalogue of chronic complaints; if, at the ſame time, it is true that this dreadful diſeaſe, peculiar to the tender and delicate, ordinarily takes its riſe, in this capricious climate, from the very diſorder in the lungs for which, in the early ſtate of it, the propoſed remedy is a certain and expeditious cure: whoever, I ſay, conſiders this, will, I hope, diſpenſe with any further apology for the loſs of time this information may occaſion him.

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* In a comparative way, theſe characteriſtics in the human ſubject are analogous to thoſe which we frequently obſerve in the ſkeletons of ſome horſes, that are ſaid to be deer-necked, high at the withers, and gooſe-rumped; all which uſually indicate more activity of ſpirit than ſtrength of conſtitution; for they are ordinarily found to be waſhy upon the road, and ſubject to coughs; in ſhort, (as the jockies term it) they are generally without bottom. To this peculiarity of make the breed of running horſes are much diſpoſed; and they are accordingly better calculated for ſhort and temporary exertions than for the continued fatigue and labour of the chace and road.

I SHALL not enlarge upon the probability there is that one part of this curative proceſs, the uſe of the Inhaler, may be extended to other beneficial purpoſes, though it by no means ſeems ill adapted to ſome ſpecies of aſthmas, or, perhaps, even to peripneumonic complaints; I do not urge this, I ſay, not becauſe it is not true, but becauſe, for other reaſons, I am anxiouſly ſolicitous that it ſhould be principally confined, in conjunction with the other part of the proceſs, to the diſorder for which it is a certain, *experienced* cure. For it is much to be apprehended, that a too extenſive and capricious application may ſubject this to the common fate of many excellent remedies in the ſame circumſtances, ſince, as I ſhall hereafter obſerve, the diſappointments of our unwarranted expectations are but too apt to operate to their diſcredit; for when a remedy is not found good for every thing, we are moſt exceedingly ready to conclude it good for nothing.

Nor ſhall I enforce the importance of the Inhaler, as applying a fotus of any ſort in the moſt effectual way to inflammatory ſore throats, or for conveying the powers of antiſeptics to putrid ones; becauſe all this may be done, though not ſo conveniently in adult age, by inhalers of the common conſtruction: but what gives this a ſuperiority to all others that I have ſeen, is, that beſides the important purpoſe, hereafter mentioned, of making a parched, feveriſh ſkin, relent, and producing a ſweat, whenever that evacuation is neceſſary, this Inhaler extends all its advantages to children, who, for want of ſkill in the uſe of the common ſort, ariſing from the neceſſary interruptions in breathing, have hitherto been deprived of their help.

I AM well aware that neither my time or abilities have been ſufficient to furniſh out that correctneſs which is neceſſary for the public eye---and, perhaps too, I may be expoſed to unfavourable criticiſm, for having digreſſed into diſquiſitions and remarks unconnected with, or at leaſt not eſſential to, the principal ſubject of this treatiſe. To the firſt I have only further to ſay, that if the knowledge intended to be communicated is intelligibly conveyed, and found practically uſeful to the world, my utmoſt expectations, and indeed wiſhes, will be anſwered; and to the latter I would beg leave to obſerve, that as I have not, under an affectation of medical erudition, inſulted the reader's judgement, by retailing what has been ſaid by others; and as the following obſervations and reflexions, reſulting from a long and extenſive courſe of practice, would, if not thus introduced, probably have never made their appearance at all, though I thought the communication of them a ſort of a duty, I hope I may, without the imputation of arrogance, expect the indulgence of the candid.

HOWEVER, as the certain ſucceſs of the propoſed remedy depends upon its application to the ſpecific diſeaſe to which it is appropriated, I might, as a further plea, add, that in deſcription, one way of ſhewing what a thing is, is to ſay what it is not; and conſequently, in the view of diſcrimination, it was even neceſſary to mark thoſe coughs which originated from other cauſes, and conſequently, for which the remedy was not adapted.

With regard to the firſt and laſt chapters of this treatiſe, I know not how to ſecure them from the imputation of impropriety, ariſing from want of connexion, unleſs they are allowed ſhelter under the ſanction of precedents; if ſo, it may be remembered, that a late very celebrated author, through a moſt ingenious train of philoſophical reaſoning, though he began with tar-water, ended with the Trinity.

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## CHAPTER I.

THE ſudden, and ſometimes ſevere, changes of weather to which this climate is ſubject, are perhaps the moſt unhappy circumſtances attending our ſituation; and the pernicious effects of them upon the human conſtitution are ſo frequently experienced, that diſeaſes of the breaſt may be truly conſidered as endemical among the inhabitants of this iſland. We frequently find a warm ſummer's day ſucceeded by one as cold and keen as thoſe of February or March; and, what is ſtill more, even in the ſame day, the former part is ſometimes attended with ſoft breezes from the ſouth-weſt, and a warm relaxing atmoſphere, loaded with vapour; when, on the contrary, the afternoon ſhall be accompanied with a ſharp, dry, biting north-eaſt, affecting the body and lungs in the oppoſite extreme.

It is impoſſible but thoſe ſudden changes from extremes to their contraries muſt, in delicate conſtitutions eſpecially, be productive of miſchief. When alterations of weather from heat to cold, or the contrary, ſucceed gradually, thoſe ſalutary powers of accommodation with which the animal œconomy is furniſhed, may prevent any miſchiefs or perceptible diſorders; though an alteration in the conſtitution proportioned to that in external nature muſt neceſſarily ſucceed thoſe changes; but that which might, without inconvenience to the conſtitution, be produced gradually, will, if too ſudden and abrupt, require help, and be felt as a diſeaſe; as a man may with eaſe and ſafety gradually deſcend a flight of ſteps, when a ſudden jump from them would endanger his life.

The diſorder we commonly call a Cold is generally ſuppoſed to be produced from a ſudden check of perſpiration, by the action of cold upon the ſurface of the body or the lungs; and without entering into a ſpecification of the particular complaints ariſing from it, it is very evident on a general view, whatever is the proper proportion of this diſcharge to different ſubjects, or the ſame ſubject under different circumſtances, that any ſudden ſuppreſſion or interruption of any excretion which is neceſſary to a ſound ſtate of the conſtitution, muſt be productive of miſchief. It is true alſo, that as the ſum of the perſpirable matter is diſcharged jointly from the ſurface of the body and the lungs together, any interruption to the former muſt throw a greater load upon the latter, and perhaps ſometimes more than they are able, or were indeed originally deſigned to endure. And accordingly, moſt probably from this cauſe it is, that we frequently obſerve in aſthmatic patients, eſpecially thoſe who perſpire moſt in ſummer, that when, by the effect of winter or cold weather, the perſpiration from the ſurface of the body is leſſened or interrupted, the lungs ſeldom fail to complain of the additional burthen, by an increaſe of the aſthma.

EVERY one muſt have obſerved in the act of reſpiration, when the expired vapour is condenſed and made viſible by the cold air of a froſty morning, or when it is collected by breathing upon cold glaſs or marble, what a quantity of moiſture is thrown off by every ſucceſſive expiration; we cannot therefore but conclude from hence, that a great part of the perſpirable matter diſcharged from the body paſſes off this way, by the agency of the lungs. Indeed it has been proved that the lungs, in the ordinary ſtate of the animal œconomy, do in fact diſcharge conſiderably more perſpirable matter than the whole body beſides; nor is this to be wondered at, ſince the lungs are ſo elaborately organized, that Dr. Hales has demonſtrated the ſum of the ſurfaces of the veſicles or pulmonary bladders to be more than equal in extent to the ſurface of the whole body.

We are not to ſuppoſe, however, that this prodigious quantity of humid matter which we ſee ſo perpetually diſcharged in the breath, pervades the bronchia and veſicles of the lungs, when they are diſtended in a full act of inſpiration. under the ſame form of vapour in which it appears when conveyed off in the act of breathing; for it is firſt undoubtedly diſcharged from the blood veſſels into the pulmonary cells as lymph; by which means, at the ſame time that the neceſſary diſcharge of the materia perſpirabilis is made from the blood, the ſides of the veſſels alſo are kept moiſt and in a proper condition, either for the admiſſion of any, perhaps inexplicable, properties in the air which may be neceſſary to life, or for the ejection of ſomething out of the conſtitution which, though it may eſcape our notice, would, if retained, be miſchievous to it. This humid lymphatic matter is not only found by diſſection to cover the ſurfaces of the pulmonary veſicles, but Dr. Hales has proved by actual experiment, that water injected into the pulmonary artery, paſſed from the extreme branches of it ſo freely through the tunicles of thoſe veſicles into the cells themſelves, and thence into the bronchia, as to flow plentifully thro' the windpipe when it hung in a depending poſture. He found alſo, that though thoſe pores were ſufficiently large for a ready percolation of the ſerous part, they were however too ſmall to receive the denſe or globular part of the blood.

This lymph, moſt probably, conſtantly ſweats through the ſides of the veſicles in every poſition of the lungs, and never ſuffers a total interruption but in a diſeaſed condition of them. When the cheſt is moſt enlarged, and the lungs inflated at full inſpiration, it is likely the diſcharge is then greateſt, as the blood moves more freely at that time through the pulmonary arteries, and conſequently the ſerous part of the blood is driven with a greater impetus through the capillary branches into the veſicles; but at the completion of expiration, even when the cheſt is contracted, and the cavities of the lungs reduced to their leaſt ordinary dimenſions, the veſicles are never ſo much collapſed, but that there is a conſiderable ſurface of them expoſed, and conſequently a proportioned evaporation. Of this every perſon may be convinced by attending to his own reſpiration; for by voluntarily ſtreightening the cavity of the belly by the contraction of its muſcles, and forcing up the diaphragm, a great deal of air will be thrown out of the lungs that was left, and would have remained there, after the ordinary and involuntary act of reſpiration was finiſhed.

FROM this idea then of ſo large a quantity of matter perpetually flowing into the cavities of the lungs, where the leaſt intruſion of any fluid is conſtantly experienced to be ſo diſtreſſing and dangerous; it follows, that if Nature had not provided an effectual method for the complete diſcharge of it as faſt as it is formed, the neceſſary conſequences of ſuch an accumulation would ſoon become fatal.

The air, then, is the great agent by which this proceſs of evaporation, ſo eſſential to the purpoſes of the animal œconomy, and to life, is performed. The common atmoſphere is not only calculated, by its perfect fluidity, to waft off, in the ſucceſſive acts of reſpiration, this matter, when it is actually formed for conveyance, into vapour; but Nature has endowed it with another property eſſential to the proceſs before us, and which, as it has but lately been well underſtood, ſeems not to have been fully conſidered, in reference to the act of reſpiration.

Professor Hamilton, in a work of genius he ſome time ſince publiſhed, has, by a number of deciſive experiments, and the cleareſt reaſoning deduced from them, demonſtrably ſhewn, that the common atmoſphere has in it the property of diſſolving water, and in the ſame manner that water ſimply diſſolves ſugar or ſalt, or that any other ſubſtance is diſſolved in its proper menſtruum: that this property is perpetually operating upon all the waters that cover the face of the earth: that the power of this principle is ſo ſtrong, that it diſſolves water even under the concentrated form of ice. It is obſerved too, that the activity of this power is greateſt when the air is in motion, or in a ſtate of agitation; and that when the water is ſo diſſolved, the quantity ſuſpended by, and its perfect ſolution and tranſparency in the air, depends upon, and is in proportion to, the warmth of the atmoſphere. He has likewiſe ſhewn, that after a certain ſtate of air has diſſolved, and retained as much water as it can hold in a ſtate of tranſparency, a colder condition of the air ſucceeding, will not keep it ſo ſuſpended and diſſolved, but part with it again in a turbid precipitating ſtate. From theſe and other conſiderations, Dr. Hamilton has given a moſt ingenious and ſatiſfactory account of the riſe and deſcent of vapours, and the formation of clouds, &c.*

This active principle in the air being eſtabliſhed, whoever conſiders the ſtructure of the lungs, and forms an idea of them, with their complement of air, at the time of a full inſpiration, cannot but perceive how admirably contrived they are for unloading the conſtitution of that prodigious quantity of moiſture perpetually thrown off from their ſurfaces.

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* Vide Hamilton's Philoſophical Eſſays.

For, firſt, if the quantity of a fluid diſſolved or evaporated in a given time depends upon the ſurface expoſed; ſecondly, if the activity of the diſſolving principle is in a great meaſure increaſed by the motion or agitated ſtate of the air; and laſtly, if the power of retaining water, ſo diſſolved, is alſo greater in a warm than a cold ſtate of the air; with theſe facts in view, I ſay, we cannot but perceive how compleatly an animal is furniſhed with an apparatus for the purpoſes of evaporation, or the diſcharge of the materia perſpirabilis from the body.

The lungs, though totally without the power of motion in themſelves, paſſively follow the ſucceſſive enlargement and contraction of the cheſt. In every inſpiration the moiſtened and extenſively expanded ſurfaces of the bronchia and veſicles, expoſe to the utmoſt advantage, and with the greateſt poſſible ſurface, the fluid to be diſſolved to the diſſolving medium; the power of which is, at the ſame time, rendered active to a great degree by the two other requiſites of heat and motion; after which, by expiration, the fluid ſo diſſolved and taken up is ſucceſſively and completely waſted off.

THIS quantity of humid matter thus diſcharged, as it is compleatly diſſolved in the cavities of the lungs under a diſtended ſtate of them; ſo, when it is conveyed by expiration into an atmoſphere ſufficiently warm to maintain the ſolution and ſupport its tranſparency, is therefore unperceived. But, on the contrary, when it is diſcharged into the chill air of a froſty morning, we can then judge of the quantity, by the turbid and undiſſolved form in which it then diſcovers itſelf.

BY this perpetual ingreſs and efflux, therefore, of the air, or, in other words, by the ſtated and ordinary act of reſpiration,

ſpiration, which is coeval with the birth, and ſubſequently as durable as the life of the animal, there is conſtantly and ſafely conveyed from the conſtitution a prodigious quantity of excrementitious matter, which would otherwiſe, by choaking up the bronchia and veſicles of the lungs, very ſoon, in a way of ſuffocation, prove deſtructive to the animal.

ACCORDINGLY, we ſee the importance of this evaporating proceſs to the animal œconomy, and indeed to the very exiſtence of the animal, by the want of it at the time, or at the approach of death; for the laſt period to life is generally the immediate reſult of a defect of this operation. When the vital, and conſequently muſcular powers of the animal, are ſo far weakened, either by age or diſeaſe, that there is not a ſufficient ſtroke of ſtrength remaining to enlarge and contract the thorax ſufficiently for the purpoſes of complete evaporation, by a full and perfect reſpiration, which is therefore, with a laborious languor, imperfectly performed; the whole leakage into the veſicles is, conſequently, not conveyed away; and therefore, by gradually choaking up the cells, and rendering ſo much of the lungs as it poſſeſſes uſeleſsly inactive, it becomes an accelerating cauſe of diſtreſs, till the matter, by a ſlow and imperfect evaporation, being thickened, and, notwithſtanding the weak and ineffectual efforts to diſlodge it by a cough, increaſed at laſt to ſuch a quantity, as to fill up the larger ramifications of the bronchia, the haſtening period to reſpiration, and the conſequent approach of diſſolution, is proclaimed by that fatal ſymptom, vulgarly called the rattle; a ſound ſufficiently convincing that life is at laſt terminated by ſuffocation.

HITHERTO we have ſeen only, that one great uſe of reſpiration is that of diſcharging a large quantity of matter from the lungs, which we may call excrementitious, as it is no longer neceſſary to animal life, and which therefore, if retained in the blood, would undoubtedly be prejudicial to it. I cannot, however, help taking notice of another ſtriking advantage ariſing from reſpiration, though perhaps it may not be eſſential to the ſubject before us; and that is, the neceſſary ventilation of the blood, or that refrigeration which it perpetually ſtands in need of, and actually receives in reſpiration.

WHATEVER is the cauſe of animal heat, we have the greateſt reaſon to ſuppoſe, that if the effects of that principle were not counteracted, and at times powerfully too, by a perpetual influx of air into the lungs, the blood would frequently acquire ſuch a degree of heat as would prove deſtructive; for though the circulation of the blood may not, poſſibly, be the cauſe of, yet, however, it generally keeps pace with, the heat of the animal, and the in-draughts of air are in proportion to the former; i. e. *cæteris paribus*, the reſpiration keeps pace with the pulſe, when the rapidity of the blood is increaſed, either by exerciſe or the preternatural exertions of the heart in a fever.

When an animal is engaged in great exerciſe, or a continued violent action of the muſcles, as in running up hill, &c. juſt in the proportion that the circulation is increaſed for the purpoſe, perhaps, of ſupplying ſo much motion, or ſo great a conſumption of ſtrength, we find the reſpiration is quickened to keep down the increaſing heat. For this reaſon, therefore, if in a fever we ſhould not chuſe to diſturb a ſick child in its ſleep by the touch of the pulſe, a pretty certain judgment of its velocity may be formed by attending to the increaſed or diminiſhed reſpiration.

A PERPETUAL influx of freſh cold air has undoubtedly a tendency, by the mode of ſimple contact only, to communicate the degree of cold poſſeſſed by itſelf to all the adjacent parts to which it is applied; but if we reflect upon the denſity of the matter to be cooled, and conſider how rare the ſubſtance is that is acting upon it, the ſpecific gravity of blood to that of air being as 841 to 1, it ſhould ſeem that the coldneſs of the air, ſimply conſidered, could not be at all times adequate to the important purpoſe of refrigeration, more particularly when the heat of the body is increaſing faſt.

If the heat of the blood in this climate, and in the ordinary ſtate of it, is ſet down at 98, and a man can ſupport himſelf, and live in a ſtate of health and eaſe, when the thermometer is at 75; what great degree of cold can the air communicate to the blood, when the denſity of this to that is at 841 to 1, and the active principle of cold in the former but 23 degrees greater than that in the latter?

In the iſland of Jamaica, when the thermometer ſtands under 76, the weather is conſidered as cold, and the inhabitants guard againſt it by additional cloathing; but the ordinary ſtate of the Mercury in that climate is from 82 to 86, or 88, though it ſometimes riſes to 96; and I have been credibly informed likewiſe, that in Bengal the thermometer has been known as high in the ſhade, and under a tent, as 108. In thoſe circumſtances, therefore, ſuppoſing them at all permanent, or that the maſs of the whole body was capable of being ſoon brought to the temperature of the external air, upon the ſame principle of ſimple contact, the effects of the heat on the blood would, undoubtedly, ſoon be fatal.

Whenever heat or cold is intended to be communicated by one body to another, we ſee, in a thouſand inſtances, how much depends upon the different denſities of the agent and the ſubject of its operation; and if a dead body, perfectly cold, were to be immerſed in air of any determined heat, and ſo circumſtanced, that it could receive no increaſing warmth by any kind of contact with a matter of greater denſity than air; we ſhould find the progreſs of its influence upon ſo large and ſolid a maſs would be exceedingly ſlow; but it certainly requires, with the ſame medium, as much time to cool a maſs that is warm, as it does to warm the ſame volume of matter when it is cool. And therefore, as the air, on account of its rarity, would require a very long time before it could act ſo effectually upon the body, as, in a way of refrigeration, to reduce its pernicious heat; ſo, on the other hand, when the heat of the air happens to be equal or ſuperior to the blood, as in the inſtances above-mentioned, the ſame want of denſity prevents it from imparting to the animal maſs a degree of heat which would be deſtructive to it; i. e. as thoſe extreme degrees of heat in the air are generally temporary and ſhort, ſo that medium is happily diſqualified by its tenuity for producing its pernicious effects, before it is reduced back to a more innocent temperature.

Though by the ordinary act of reſpiration, therefore, by a conſtant and uniform application to the ſides of the lungs, the air could be ſuppoſed ſufficient, by a communication of its temperature, to perpetuate the degree of heat which the animal ordinarily enjoys, in a tranquil ſtate of health, and in the mean exertions of the heart, it certainly, however, is not in the power of ſo rare a ſubſtance, by ſimple contact only, to check a rapidly increaſing heat of the body from ſudden and extraordinary cauſes; and much leſs when the heat is actually ſo increaſed, to reduce it back to the common ſtandard, with that expedition which we frequently experience.

THIS refrigeration then, ſo eſſential alſo to life, muſt ariſe from, or at leaſt be aſſiſted by, a more active principle than the cauſe abovementioned; and it ſeems very clear, that ſome late diſcoveries have amply furniſhed one, though it has not been applied to the purpoſe before us.

FIRST, then, ſimple evaporation is now well known to be productive of actual cold in the matter or ſubſtance to which the evaporating fluid is applied; and that too, in certain circumſtances, to an extreme degree. How, or by what means, it produces this effect, is perhaps inexplicable; however, the truth of it being demonſtrably proved by a great number of experiments, we may certainly avail ourſelves of the fact, upon the principles of a well-grounded analogy.

SECONDLY, It is obſerved, in experiments to this purpoſe on the thermometer, that the cold produced is but of ſhort duration; and, therefore, as the continuance of the generated cold is only during the evaporation, the more volatile the matter is, the more frequently the bulb of the thermometer muſt be moiſtened with it, if the degree of cold is meant to be continued or increaſed; otherwiſe the mercury will again acquire the general ſtate of the circumambient air, and return to the degree at which it ſtood before.

THIRDLY, that *cæteris paribus*, the more volatile the fluid, the quicker the evaporation, and of courſe the greater degree of cold produced by it in a given time; yet this will not hold good with fluids in different circumſtances; for, if the evaporation of an aqueous or leſs volatile fluid, can by any means be rendered as expeditious as that of another in its nature more ſpirituous, the degrees of cold produced by both will be the ſame; unleſs, as Dr. Cullen has obſerved, the ball of the thermometer be moiſtened with any of the foſſile acids; for then, on the contrary, a degree of heat is produced, the cauſe of which is probably their attracting water from the air; for thoſe acids mixed with water are known always to produce heat: theſe therefore, though they counteract the effect of evaporation, are no objection to the fact before us.

FOURTHLY; ventilation, or a current of air, is known by the haſtening evaporation to increaſe the conſequent cold to a very great degree. Accordingly,

dingly, the moment the bulb of the thermometer is moiſtened with a volatile fluid, the evaporation is haſtened, either by nimbly moving it to and fro in the air, or by the blaſt of a pair of bellows; and the degree of cold produced is then not only greater, but greater in proportion to the ſuddenneſs of the evaporation.

FIFTHLY, and laſtly; it is found by experiment, that the effects of evaporation, as producing cold, depend in a great meaſure upon the heat the body poſſeſſes that is to be acted upon; inſomuch, that the ſame degree of evaporation produces a greater degree of cold upon a warm body than upon one that is colder. Thus, if the thermometer ſtood at 80, the evaporation of the ſpirit from one immerſion or moiſtening of the bulb, would ſink the mercury conſiderably more than if the experiment were made upon the inſtrument, when, in a colder ſtate, it ſtood at 40. The cold, therefore, which is cauſed by evaporation, or rather the effect produced by it in the body to be cooled, is in a certain increaſing ratio to the warmth of the latter.

Thus much being premiſed as to the foregoing principle of cold from evaporation, and the obſervations relating to it being eſtabliſhed; from theſe data the following conſequences, with regard to animal reſpiration, will neceſſarily follow.

First. The whole body of the lungs, and of courſe the blood contained within them, muſt be neceſſarily ſubject to the influence of, and conſequently be cooled by, that rapid evaporation from their ſurfaces, which is neceſſarily produced in reſpiration; and this for the ſame reaſon, whatever it be, that the thermometer demonſtrates the effect of this principle by the ſudden fall of the mercury during the evaporation of a fluid with which its ball had been moiſtened.

Secondly. As conſtant evaporation is neceſſary, if the cold is meant to be perpetual, ſo we ſee that in animal life, where there is a neceſſity for the perpetual operation of this principle, the proceſs of evaporation commences with the birth, and continues unremittingly till death.

THIRDLY. Since in a given time the degree of cold produced, depends upon the expedition with which the fluid evaporates; ſo, though the matter in the lungs which is to be evaporated is of a lymphatic or aqueous kind, and therefore not in its own nature at all volatile, yet if its ſluggiſhneſs can by any means be ſo far overcome as to render its evaporation equally expeditious with that of a fluid poſſeſſing greater volatility, it will become as proper for the purpoſe of refrigeration as the latter.

FOURTHLY. This effect is produced by ventilation, as it evidently haſtens evaporation, and by that means eventually increaſes the cold reſulting from it: it is therefore ſcarcely poſſible to conceive an apparatus more completely calculated for this purpoſe, than the lungs in the act of reſpiration, as by their means the effect of ventilation on the evaporating fluid is very conſiderable, as well as perpetual.

AND, laſtly, As the cold produced by evaporation affects the ſubject operated upon in proportion to the degrees of heat already poſſeſſed by it, the operation of this principle is of the laſt importance to animal life, ſince the effect of it will always keep pace with the demand there may be for its aid: for when by very great labour or exerciſe, or the preternatural exertions of the heart in a fever, or by any other means whatever, ſuch a rapidly increaſing heat is produced, as would, if not kept under, very ſoon prove fatal to life; the reſpiration at the ſame time being always proportionally quickened, the evaporation, and the conſequent cold produced by it, will not only be more conſtant, but the effect of that cold upon the blood will be greater; ſo that the degrees of its activity will be exactly proportioned to the aid the animal then ſtands particularly in need of, from this important principle.

Indeed, if the thermometer had not given us thoſe demonſtrative proofs of the power of evaporation in producing actual cold, one ſhould have ſuppoſed that our own feelings might have been ſufficient to have convinced us of the exiſtence of the principle. Whoever has dipped but his finger in ſpirit of wine, or has accidentally had any of it ſpilt upon his hand, or on his head after cloſe ſhaving, muſt have perceived a very ſenſible cold produced as it was drying off.

The different degrees of cold ſometimes perceived, and always produced, by the evaporation of fluids of different volatility, may, perhaps, be one reaſon why the being wet-ſhod with, or falling into freſh water, ſo often, by checking perſpiration, produces a cold, when the ſame accident with ſalt water is very ſeldom known to be attended with that inconvenience.

It might be worth inquiring alſo, whether the agreeable coolneſs which a feveriſh patient enjoys after a ſweat, or when it is drying off or evaporating from the body, may not, in part at leaſt, be owing to the effect of this principle, as well as to the tranquillity ſuppoſed to be ſuperinduced by the critical diſcharge of a matter offenſively ſtimulating to the conſtitution.

The application of the foregoing facts to reſpiration is ſo obvious, that I ſhall enlarge no farther upon it, nor attempt to enforce a truth ſo very evident. After, therefore, remarking that, beſides the purpoſe of diſcharging the *materia perſpirabilis* from the body, and obſerving that it is impoſſible to conceive an apparatus more completely formed for refrigerating the blood, as far as the principle of evaporation is effectual to that purpoſe, than the lungs under the conſtant and perpetual act of reſpiration, I ſhall conclude this ſubject with the following reflexion.

In our attempts towards the examination of cauſes and effects relating to the animal œconomy, we are too apt, in a confined way, to conclude, on the diſcovery of ſome few which ſtand moſt obvious to view, that we are arrived at a perfect diſcovery of the ſubject in queſtion, and accordingly to flatter our pride with the triumph of a complete inveſtigation.

BUT, to inſtance in the ſubject before us; however great, and indeed eſſential to life, thoſe advantages are which the animal œconomy derives from the lungs in the inſtances of evaporation and refrigeration, we cannot ſuppoſe, much leſs conclude, that the whole uſe of reſpiration is confined to thoſe, or any other individual purpoſe; for there is the ſame difficulty, and indeed impoſſibility, attending a complete inveſtigation of all the advantages the animal receives from reſpiration, that there ever will be in accounting adequately for any other phœnomenon in nature.

THE wonderful texture and complicated organization of the lungs, as well as a thouſand latent properties of the air, beſides thoſe more obvious uſes, are without doubt wiſely contrived for imparting to the blood properties which may always be eſſential to it; or for diſcharging inviſible miſchiefs from the conſtitution, which if retained might be deſtructive to life.

Such is the union and intimate connexion between all the agencies concerned in animal life, that a perfect ſolution, or an adequate account of any one thing, muſt ever neceſſarily depend upon a thorough knowledge of every thing. All, therefore, that we can expect to arrive at in inveſtigations of this ſort, is the detection of cauſes and their effects which ſtand moſt expoſed to the cognizance of our ſenſes; but there ever will remain an infinity of others, equally eſſential, which, neceſſarily reſulting from the complicated ſtructure of a machine under the influence of animation, can therefore never be perfectly comprehended till the whole of the animal, and all the principles eſſential to life, are thoroughly underſtood.

## CHAP. II.

THOUGH the lungs and air are admirably contrived, and the whole proceſs of reſpiration moſt wonderfully adapted to the purpoſe of diſcharging ſo large a quantity of excrementitious matter from the blood, their powers, though great, muſt neceſſarily be limited; and accordingly we frequently find the lungs, though without any vice in themſelves, complaining by a diſeaſe of a load of matter with which they are oppreſſed, and with difficulty diſpenſe. This is the caſe in thoſe Coughs which are cauſed by obſtructed perſpiration, ſimply conſidered; by means of which the lungs are either oppreſſed with a greater quantity of the fluid than they were formed to diſcharge, or elſe the leakage in them becomes of ſuch a ſort as may not be reduceable to vapour; and in either of theſe caſes it muſt be thrown off, if it is diſcharged at all, by unnatural and violent efforts.

But when this important organ, ſo eſſential to reſpiration and to life, is itſelf diſeaſed, we cannot wonder if fatal conſequences frequently reſult from it.

If the lungs, either from an original fault in their make, or a certain vice in the conſtitution, are attacked by tubercular ſwellings, a miſchief to which they are ſometimes ſubject, or are infeſted with gritty calculous concretions in the bronchia, a complaint to which they are likewiſe ſometimes expoſed, the organ diſcovers the diſeaſe, and is ſtimulated by the conſequent irritation into a petulant, uſeleſs cough, which, as it cannot diſcharge the cauſe, ſerves only to increaſe the evil that produced it.

When thoſe little partial abſceſſes firſt affect the lungs, they are not only attended with a ſymptomatic fever accompanying each ſucceſſive ſuppuration, but thoſe knotty tumours are, in another reſpect, miſchievous even before ſuppuration: for by obſtructing the regular circulation of the blood through the ſmall, and indeed ſometimes larger branches of the pulmonary veſſels, they produce a diſtenſion of their ſides, which by this means becoming thin and weak, frequently burſt during the violent exertions of the cough; the conſequence of which is an hæmorrhage, always alarming, and ſometimes fatal. As the diſeaſe advances, the tubercles increaſe both in ſize and number; ſo that the ſuppuration, in ſome one or other of them, being perpetual, the fever becomes a conſtant hectic; and as one miſchief is always productive of others, the parts of the lungs which are infeſted by the ſwellings, and thoſe likewiſe in the neighbourhood of them, become uſeleſs; for the veſicles, inſtead of expanding freely in reſpiration, and expoſing their contents to the air for the neceſſary diſcharge of the ordinary leakage into them, inactively ſuffer it to be pent up, till by the heat it is there conſtantly expoſed to, and the conſequent gradual evaporation of its thinner parts, it becomes not only thick, but frequently ſo acrid, as to corrode the tender ſubſtance in which it is lodged. The increaſing quantity of matter therefore which is expectorated in the advanced ſtages of the diſeaſe is not wholly pus, as it does not always ariſe immediately from the diſcharge of the tubercles themſelves, but is, from the cauſe mentioned, certainly the conſequence of them. Towards the cloſe of the diſorder, ſo much of the lungs is either waſted into, or deluged with purulence, that they are incapable of performing the office for which they were intended, or of diſcharging the perſpirable excrementitious matter from the blood; and nature, therefore, reduced as it were to the laſt ſhift, in order to rid the conſtitution of it, forces it off by preternatural exertions through the ſkin or guts, in a colliquative ſweat or a diarrhœa, either of which conſtantly and neceſſarily returns on the ſuppreſſion of the other. When, therefore, at laſt, the organ is not only rendered, by the increaſing diſeaſe, perhaps totally unfit for the purpoſes of life, but the diſorder, beſides thoſe colliquative evacuations, is accompanied alſo with a perpetual waſting hectic, a large expenſive expectoration, and other conſequent effects, which become ſo many cauſes of a decay of fleſh and ſtrength, it is no wonder that, amidſt theſe dreadful circumſtances, death puts a period to ſo many accumulated evils.

In the early ſtate of this diſorder, before the lungs are greatly injured by the number of tubercles, or thoſe, not having advanced to ſuppuration, are attended only with a petulant, dry, huſky cough; next to occaſional bleedings, cooling and refrigerating medicines, great temperance, and ſuch other means as have a tendency to preſerve the circulation in a tranquil ſtate, perhaps the greateſt benefit will be found to ariſe from ſcapulary iſſues, aſſiſted by a vegetable diet and aſſes milk; but then I cannot help obſerving, that if the diſcharge of the iſſues is expected to do any thing of conſequence, there ought to be a juſt proportion between the remedy and the diſeaſe: the diſcharge therefore ſhould be rendered ſo conſiderable, that it may be felt; or rather, if I may be allowed the expreſſion, it ſhould ſo far take up the attention of nature, as that a revulſion may be made from the lungs, and the evil diverted from ſo fatal, and perhaps habitual, a channel.

It is much to be apprehended that this ſpecies of relief by revulſion, where either by the ſtimulus of external pain, or a diſcharge of ſomething offenſive to the conſtitution, the evil is meant to be diverted from a noble part, has loſt much of its character and credit through an ill-timed tenderneſs, or modern refinement; by which

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which means the cautery of the antients is trifled into a perpetual bliſter, ſcarcely larger than a crown, or dwindled into an iſſue that will hold ſcarcely more than a ſingle pea.

I WISH indeed there may not be too much reaſon to believe that medicine in general may with equal juſtice be ſubject to the ſame criticiſm; and therefore, though it is not eſſentially neceſſary to the ſubject in which we are engaged, it would perhaps be worth while to ſtep aſide, and inquire how otherwiſe it ſhould come to paſs that ſo many articles in the catalogue of the *materia medica*, furniſhed and recommended by the experience and concurring teſtimony of many ſucceſſive ages, ſhould not practically anſwer the characters given of them? For were we to take upon truſt the virtues aſcribed to the various articles with which our diſpenſatories are furniſh'd, it ſhould ſeem that there would be few diſeaſes to which the human body is ſubject, for which we ſhould not conſider ourſelves as poſſeſſing an infallible ſpecific. This, however, is certainly very far from being the caſe; for the regular practitioner has frequently the mortification, not only to find diſorders that he does not cure with theſe medicines, but not unfrequently alſo to ſee thoſe very patients, for whom he has unſucceſsfully preſcribed, nevertheleſs radically cured by empirics. Whenever this happens, the curioſity of the world is excited towards a diſcovery of the medicine by which the cure was effected; but being known, it has conſtantly appeared to be a medicine purely officinal, with which we are familiarly acquainted, and have tried in the ſame caſe; ſo that the diſcovery, moſt commonly, only ſerves to convince us that our expectations from it were defeated by trifling with its doſe, and by not ſufficiently conſidering that it is impoſſible frequently to produce ſuch an alteration in the conſtitution as ſhall be neceſſary for the cure of a diſeaſe, without uſing a remedy, or at leaſt ſuch a doſe of it as, under an improper direction of its virtues, may be capable of doing miſchief. This has been exemplified by the large doſe of ſcammony in Dover's or Ward's hydragogue electuary; and upon this conſideration was Sydenham's complaint of the want of ſucceſs from very ſmall doſes, juſtly founded on the firſt introduction of the bark into practice.

An enumeration of inſtances would be endleſs: I cannot help, however, briefly relating one very extraordinary caſe, which is that of a lady of this town, who, ſome years ſince, laboured under a confirmed catalepſy, with which ſhe had been afflicted many months. It is neceſſary to premiſe, that there was no one circumſtance attending the ſtate of her conſtitution that could probably give riſe to her diſorder. She had ſometimes two or three ſeizures of this formidable convulſion in twelve hours, without the leaſt previous notice. While ſhe was ſtanding, frequently indeed when ſhe was talking, ſhe would be ſeized with an univerſal ſpaſm, which fixing the whole body quite erect, and, in whatever poſition they chanced to be, rendering every limb, even to the ends of the fingers, as ſtiff as if they had been made of whalebone, exhibited, if I may expreſs myſelf ſo, (for the reſpiration continued of courſe) the moſt awful appearance of death alive, or a perſon poſſeſſed, that can be conceived. In this ſituation ſhe would remain motionleſs upon her feet, with her eyes open, perhaps an hour, and ſometimes longer; nor when the conjunctiva of the eye was touched with the finger, would the eye-lids tremble; till at laſt, when the univerſal ſpaſm ceaſed, totally exhauſted and relaxed, ſhe would drop as ſuddenly as if ſhe had been ſhot through the head; and on this account, an aſſiſtant, with his arms extended, was always in waiting to receive her in the act of falling. The heart, during the paroxyſm, ſeemed to be affected greatly, for the circulation was languid, and the pulſe weak. If an arm happened to be extended at the time of the invaſion of the fit, it remained ſo during the whole of it; and if any force was made uſe of to alter its poſition, the ineffectual violence ſeemed always to give an uneaſineſs, which was diſcovered by a vibratory motion of the eye-lids.

This lady had been long under the care of the late Dr. Huxham for this formidable diſeaſe, without finding the leaſt relief; though, as may be ſuppoſed, the moſt efficacious medicines of the nervous tribe had not been neglected, and among the reſt the powder of valerian was principally depended on; but it is to be obſerved, that it had been given only in ʒſs at a doſe. As a long courſe of this and other medicines had been totally ineffectual, inſomuch that the diſeaſe ſeemed more and more confirmed; and as I had heretofore ſeen a caſe of this kind in St. Thomas's Hoſpital, where the cure was effected by very large doſes of this medicine, I adviſed a ſimilar trial of it; the conſequence of which was, that the patient had her reſolution and patience rewarded by a perfect cure. She took of the valerian in ſubſtance half an ounce at a doſe, twice a day, and did not diſcontinue the medicine till ſhe had taken to the amount of ſeven pounds.

As we have juſt now mentioned the bark, if I might be permitted to extend this digreſſion a little farther, I would obſerve that, beſides the diſcredit which many medicines, recommended to us as poſſeſſing ſpecific virtues for the cure of particular diſeaſes, have fallen into from the above cauſe, it muſt be confeſſed alſo, that moſt of them, in their turn, are unhappily ſubject to the operation of a concurrence of circumſtances, which ſeldom fail in time to rob them of thoſe very virtues from which they derived their original credit. To inſtance only in the bark; this ſubſtance was, moſt probably by accident, diſcovered to poſſeſs the real virtues of curing an intermitting fever; and, as ſubſequent experience has demonſtrated it to be a moſt noble and uſeful medicine for this purpoſe, one ſhould have naturally concluded that its reputation would have been ſecure; but, unfortunately, there is great reaſon to fear that this very reputation becomes the cauſe of, and is operating towards its diſcredit. For, firſt of all, as ſoon as the medicine became celebrated, its increaſing conſumption became a temptation to the venders to adulterate it. Accordingly a great deal of ſophiſticated and adulterated bark has at times been put into the hands of practitioners.

In the next place, this famous ſimple claimed the attention and excited the curioſity of the chemiſts, who paid it the honours of analization, attempting by this means to diſcover the principles in which its efficacy reſided, at the ſame time that they choſe to furniſh the preſcriber with forms of greater elegance; and accordingly it was manufactured into thoſe of decoction, tincture, and extract. But unfortunately, as we are unable adequately to account for its operation, and are therefore not thoroughly acquainted with thoſe principles to which it was indebted for its character, the medicine becomes, by theſe means, expoſed to the riſque of being deprived of them. And, laſtly, the practitioners, in their turn, became diſſatisfied with preſcribing it in a vulgar form, or limiting the uſe of the medicine to the complaint for which it was firſt diſcovered to be a cure, and from whence it derived its credit; ſo that it is not only refined upon, by varying the mode of adminiſtering it internally under all the above-mentioned forms of decoction, tincture, and extract, and topically by fotus, by quilting it into ſtomachers, &c. &c. but added to all this, I ſay, the uſe of it hath been, upon the credit of ſpeculation, extended to a variety of diſorders to which perhaps it never was adapted, at leaſt to the cure of which it certainly was not indebted for its character as a medicine.

And what muſt be the reſult of all this? Why, only that the original medicine becomes anſwerable for all the conſequences of our modern whimſical refinements, as well as of all thoſe other cauſes which are operating towards its diſcredit: for as ſoon as ever it is found, from its maimed condition and injudicious uſe, not to anſwer our unreaſonable expectations, it is then wiſely diſcovered not to be good for every thing; and the very next ſtep to that comes the uſual concluſion, that it is good for nothing.

Thus may an excellent medicine fall into diſrepute, and for a long time ſupport its memory only by a monumental record in our diſpenſatories, till chance, or the practice of an empiric in ſucceeding times, again revives its credit, by a proper, and perhaps ſimple, adminiſtration of its virtues.

To return from this digreſſion to the ſubject of ſcapulary iſſues.

The good conſequences of a proper diſcharge of this ſort, in pulmonary complaints, I have not only in many inſtances ſeen, but have actually experienced to a very remarkable degree in my own perſon.

In the early part of my life, with a conſtitution rather tender, and inclined to a hectic, I fell into a very formidable diſorder of the lungs, attended with a dry cough, great oppreſſion upon, and ſhooting pains through my breaſt; a hectic fever, accompanied by a ſpitting of blood, which continued ſeveral months; fluſhes alſo after eating, and the uſual parched ſcalding feel of the palms of the hands and ſoles of the feet; and, as a conſequence of all theſe, a waſting of the fleſh to a very conſiderable degree. After numerous bleedings, the uſe of the cortex, a long courſe of the Briſtol waters upon the ſpot, and the various tribe of balſamics, to no purpoſe, I had, by means of a cauſtic, a large iſſue of between two and three inches diameter, and which afterwards held between forty and fifty peas, opened between my ſhoulders. When the ſlough ſeparated, and the diſcharge became complete, I ſoon felt the good effects of it, in the abatement of the irritation in my lungs, the total removal of the load from my breaſt, and, in no long time, a relief from all my other complaints; which, by continuing the diſcharge ſome conſiderable time, never returned.

This drain was from the beginning aſſiſted by aſſes milk and a vegetable diet, the latter of which was perſevered in near a twelvemonth after.

By theſe ſimple, but important means, a ſucceſsful period was put to a very formidable diſorder, which, I am well perſuaded, had the ſtreſs of treatment reſted on the tribe of balſamics, would have ended fatally.

If any great dependence is placed upon, or real ſervice expected from a courſe of aſſes milk, it is neceſſary that this alſo ſhould not be trifled with. If the bowels will bear it, it certainly ought to make the greateſt part of the patient's nutriment; and indeed, by this means, I once ſaw an obſtinate induration of the whole breaſt entirely removed, notwithſtanding it was impenetrably hard, and included all the characters of a ſcirrhus, but the lancinating pain had reſiſted every other means of diſperſion. In this caſe the patient was conſtantly ſupplied with the milk of two milch aſſes, for it made, except a little fruit, the whole of her nutriment. Indeed, if one conſiders the matter cloſely, the good effects of ſuch a diet, when puſhed to this extent, are not to be wondered at; for there is certainly ſuch a principle of renovation in the conſtitution of an animal, that if the cauſe of an evil is once removed, there is a perpetual effort in nature to reinſtate itſelf, by the removal of the morbid effect; and of whatever kind the fault in the habit is which gives riſe to a diſeaſe, it is improbable that it ſhould be ſupported when the whole food or fund of accretion, conſiſting of ſo ſoft and bland a nutriment, carries no principles of acrimony with it into the conſtitution.

AND here I cannot help animadverting to the very little ſervice that can reaſonably be expected, and, to ſay the truth, ever is experienced to ariſe in this diſorder of the lungs from balſamics, or thoſe ſubſtances which may have been ſuppoſed to poſſeſs detergent or healing virtues. Our ideas of the efficacy ſuppoſed to reſide in the reſinous or terebinthinate tribe moſt certainly took their riſe from the effects they have been obſerved chirurgically to produce upon wounds on the ſurface or external parts of the body. But however apparently uſeful their detergent or healing qualities may be when actually applied to the ſurface of ulcers or wounds, that ſurgeon would be thought ſurely to practiſe from a very coarſe analogy, who ſhould attempt to cure an ulcer in the leg by conveying his application into the ſtomach; for, in fact, after the medicine is mixed with the aliment in the ſtomach, the chyle in the guts, and the whole maſs of blood, there is as large a ſhare of it conveyed in the round of circulation to the extremities as to the lungs, and perhaps not one jot of that in which its external efficacy conſiſted ever reaches either.

Nor, unleſs actual experience confirms the contrary, ſhould it ſeem very probable that antiſeptics, topically applied to the lungs, ſhould in this mode of adminiſtration be poſſeſſed of the ſalutary powers aſcribed to them, ſince the reaſoning here alſo upon which this practice is founded does not appear to reſult from a juſt analogy. We are not here concerned with that diſpoſition to actual rottenneſs which is produced by a ſea-ſcurvy; and unleſs it can be made appear that the ordinary cauſe and proceſs of putrefaction in a dead body are the ſame as in the parts of a living one under a ſtate of purulence, where the principle of life is concerned in the proceſs, ſuch a concluſion cannot certainly be drawn, as it is much leſs than probable that the ſame effects from an application ſhould follow in ſubjects ſo differently circumſtanced,

ſtanced, and between which therefore no well-grounded analogy ſeems to ſubſiſt.

It might likewiſe be obſerved with regard to the ſpitting of blood, ſo frequent in this diſordered ſtate, or other tenderneſſes of the lungs, that in this complaint alſo, as well as many others, we ſeem to draw falſe ſpeculative conſequences from the effects which medicines produce on the palate, as well as on the external parts of the body. The bark, with the addition of elixir of vitriol, for inſtance, as well as the tribe of aſtringents, were undoubtedly firſt recommended for an hæmoptoe, from the teſtimony the palate gave of their ſeveral qualities; whereas, were they in fact to paſs into the blood with thoſe corrugating powers unaltered, by which they are cognizable to the ſenſe, they would be ſo far from anſwering the end propoſed, or producing ſalutary effects, that the uſe of them would be attended with mortal conſequences. This an injection of a few drops of elixir of vitriol into the blood ſufficiently demonſtrates. However ſafely, therefore, this information of the ſenſe may be truſted for their ſimilar and good effects upon the firſt paſſages, the ſtomach and guts, by the time that thoſe medicines, or the ſuppoſed virtues of them, reach the circulation, the original qualities which they poſſeſſed, and by which they were known to, and for which they were recommended by the taſte, are loſt. All this, however, though certainly true, is notwithſtanding no proof that the bark, with elixir of vitriol, is not an efficacious medicine for a ſpitting of blood; but it is very certain, from theſe conſiderations, that they do not produce their effects agreeably to our ſpeculative notions, or in the manner a ſtyptic operates externally, by corrugating and purſing up the mouth of a ruptured veſſel in the lungs, but by virtues, of whatever nature they are, which thoſe medicines have been practically found to poſſeſs. The bark, being rendered more active and efficacious by the elixir of vitriol, moſt probably cures this complaint, by taking off the latent hectic fever, of which the hæmoptoe is a ſymptom, and upon which the continuance of it depends.

With regard to the ſpecies of pulmonary phthiſis now under conſideration, the truth of the matter ſeems to be this, that the diſeaſe, though ſo very formidable, never becomes, however, certainly fatal, till the morbid ſtate of the lungs is complicated with, or produces, a bad habit of body.

We ſee, when the juices of the conſtitution are in a ſound and uncontaminated ſtate, and the renovating principles of nature are therefore active and vigorous, that in the largeſt recent wounds ſkin and fleſh are formed, not by any particular creative virtues in the ſurgeons applications, but from certain powers of renaſcence exiſting in the conſtitution; for thoſe medicines will no more produce thoſe effects in a living ſubject with a certain depravity of the habit, than they will in a dead body. Accordingly the public hoſpitals perpetually afford us inſtances of the truth of this, even in large foul ulcers, which, provided they are unaccompanied with caries, generally heal of themſelves when patients are committed to the bed, and by means of an horizontal poſture, the leakage from the ſuperior parts of the body does not irritate the wounds. However, if in theſe circumſtances they do not heal, the ſurgeon cannot cure his patient till the habit of body is firſt mended.

Thus, in injuries of the lungs, nature has not left an organ ſo important, and indeed ſo eſſential to the very being of the animal, though expoſed to accidents, yet totally unfurniſhed with the powers of reparation; for even here, where the habit of body is good, wounds, and conſiderable ones too, are not always mortal, but ſometimes heal of themſelves, and not unfrequently as expeditiouſly as thoſe on the external ſurface of the body. This we frequently ſee in thoſe who have had the misfortune to be ſhot or run through the lungs, as well as in the caſe of many other ſlighter accidents from ruptured veſſels; for in a healthy ſubject, provided the great veſſels eſcape, thoſe accidents are ſeldom attended with fatal effects.

REMARKABLE inſtances of the ſpontaneous cure of very conſiderable injuries of the lungs are ſometimes ſeen, not only where the injury is received in a ſtate of health, with a good habit of the body, and where there is an active diſpoſition in the conſtitution to remedy accidental defects; but we are not without examples, where very conſiderable complaints in the lungs, which had taken their riſe from, or at leaſt during a fault in the conſtitution, have however, upon a ſalutary alteration in the habit, healed of themſelves. An extraordinary caſe of this ſort I remember once to have ſeen in St. Thomas's, in a patient of Sir Edward Wilmott. Whether the diſorder began before his admiſſion, or commenced during his reſidence in the hoſpital, I do not now recollect, but the man however fell into a pulmonary phthiſis. After ſpitting off large quantities of pus, attended with a hectic fever and colliquative ſweats, he was at laſt reduced to ſo weak and emaciated a ſtate, that all probability of phyſical relief being at an end, and his death daily expected, he ceaſed being particularly attended to at the ordinary viſits of the ward. The man, however, lived on; and at laſt, contrary to the expectation of every one, the diſeaſe ſeemed not only not to gain ground, but appeared to afford ſome ſlight indications of a poſſibility of recovery. The purulent diſcharge evidently abated; his night ſweats were leſs profuſe; the quick and palpitating pulſe began to be more quiet and diſtinct; and ſome little appetite returning, his countenance and eyes ſeemed to promiſe ſome hopes of returning life. Theſe very extraordinary and unexpected appearances engaged the attention of his phyſician, who recommended a diet ſuited to his circumſtances, and adviſed him to remove into the country. About three quarters of a year after, this very patient was again admitted into the hoſpital for a complaint in his leg, though otherwiſe in perfect health; and during his reſidence there, was unfortunately ſeized with the ſmall-pox, and died. As his former cure had been ſo very ſingular, the body was opened, when it appeared that, during his conſumptive complaints, the greateſt part of the right lobe of the lungs had been totally deſtroyed, and that, conſequently, reſpiration had principally been performed by the left.

From theſe, and other inſtances to the ſame purpoſe, we muſt conclude that nature has provided the ſame common means for repairing accidental injuries and defects of the lungs, and thoſe of the external and leſs important parts of the body; but there ſubſiſts, however, this eſſential difference between them. Theſe, when complicated with a contaminated or bad habit, though they will not heal, are not therefore fatal; but thoſe, when they do not heal, become mortal, becauſe the organ that is the ſubject of them is eſſential to life.

With regard to medicines of the balſamic claſs, if ever they become really uſeful, one ſhould ſuppoſe that they would be ſo by topical application, i. e. by inhaling the virtues of them; ſince under this mode of adminiſtration, their more volatile parts are actually applied to the internal ſurface of the lungs, and therefore ſtand a very great chance at leaſt of coming into contact with the diſeaſed part: it is poſſible therefore there may be inſtances, now and then, where the balſamic property of the blood being not deſtroyed by a bad habit, this manner of application may be uſeful.

Accordingly, though the inſtances are not ſufficiently authenticated, we are told that patients in the above circumſtances have been ſometimes recovered by inhaling ſmoke from reſinous ſubſtances; and indeed I ſaw myſelf an inſtance where there was great reaſon to believe that a patient who had ſuppurations in his lungs, and ſpit up large quantities of purulent matter, ſo fœtid that he became nauſeous to his neareſt friends, received great benefit from this mode of applying the vulnerary virtues aſcribed to this claſs of medicines. The patient was ordered to ſit in a very ſmall room, which was filled with the ſmoke of the common rezin, by now and then ſprinkling a little of it upon a hot iron, and this he continued to do twice a day for a fortnight. The patient recovered perfectly. But as this application to the lungs was made on his removal into the country, and it was therefore uncertain how far the change of air (though I never ſaw it produce ſo remarkable an event) might be inſtrumental towards the recovery; and it being but a ſingle inſtance alſo, I do not mean to draw any certain concluſion from it.

HOWEVER, I have often thought that upon no other principle can the good, and ſometimes ſpeedy effects which conſumptive people have experienced from ſea voyages, be accounted for. That change of air ſhould be ſometimes uſeful in diſorders of the lungs, is not to be wondered at, when we conſider the heterogeneous nature of the common atmoſphere, and how very different it is, in different ſituations, from the various exhalations peculiar to each ſoil; and we accordingly find theſe varieties ſeverally proper for different conſtitutions, under different complaints. There are therefore undoubtedly incomprehenſible powers in animal nature by the inſtrumentality of the lungs, that great medium of correſpondence between the animal œconomy and external nature, to avail itſelf of thoſe properties in the air which may be neceſſary to the peculiarities of the conſtitution. For this reaſon moſt certainly it is that a journey to a diſtant country, perſued through different airs, is often much more ſalutary than daily rides of an equal number of miles in the ſame air. The great influence of the change of air is in no diſorder of the lungs more apparent than in the whooping cough, where ſeveral ſucceſſive changes are neceſſary, and almoſt always complete the cure. After the patient has been ill about a month, (for he will receive little benefit till the diſorder is completely formed, and at its height) the advantage of the firſt change of air is almoſt always perceived: but the good effects of that ſingle change are limited; for thoſe peculiarities belonging to it, which are neceſſary to the then diſordered ſtate of the conſtitution, in a very few days ſeem as it were to be exhauſted, and to have done all that is to be expected from them; ſo that the cough is again at a ſtand, and the patient advances very little farther towards recovery. But if, every four or five days, he is removed into a different ſituation, each ſucceſſive change will be followed by a very ſenſible advantage, and by this means a ſpeedy iſſue is generally put to the diſorder.

All this is intelligible enough, as the advantages received evidently depend upon a real difference in the quality of the air in different ſituations; but the good conſequences of which a ſea voyage is frequently productive, cannot ariſe from this conſideration; for if it were owing to the one great change from a land to a ſea air, reſidence on a ſmall iſland, or the extreme parts of our own, or indeed a removal to any part of the ſea-coaſt, would be attended with the ſame advantages, which is certainly not the caſe. Nor can the good effects of the voyage ariſe, the influence of different climates excepted, from a conveyance to different or diſtant parts of the ocean; becauſe the ſea air being uniform, the ſameneſs of its exhalations does not furniſh out the ſame variety of reſources, ſo neceſſary to the particular circumſtances of a diſeaſed conſtitution, as are to be found in the air at land.

The recoveries which are ſometimes ſeen in pulmonary conſumptions, by means of ſea voyages, may indeed be partly owing to a ſalutary alteration in the conſtitution in general, ariſing from the effects of a better and warmer climate; for a very conſiderable increaſe of the general external perſpiration will undoubtedly take off a large ſhare of it from the lungs, which cannot but be of the utmoſt conſequence, as by the morbid condition to which they are reduced, they are not equal to the taſk of conveying from the blood the ordinary ſhare of that excrementitious matter which nature has allotted to them. This therefore, by gradually reinſtating the purity of the blood and juices, may again reſtore the renovating principle, or, to expreſs it chirurgically, may, by altering the habit, produce that diſpoſition which is ſo eſſential to the healing of wounds in every part of the body. However, though this is a very important conſideration, I am inclined to believe, and eſpecially from the ſometimes ſudden effects of ſea voyages, that the ſalutary influence of climate is greatly aſſiſted by another circumſtance of perhaps no leſs weight, which is, that on ſhipboard the patient lives in, and is therefore perpetually inhaling, night and day, an atmoſphere fraught with the volatile parts of all the reſinous and terebinthinate ſubſtances ariſing from the ſhip and its furniture, which are ſuppoſed to be ſo peculiarly adapted to a morbid ſtate of the lungs; and affect them likewiſe, under thoſe circumſtances, by the beſt mode of application. This conſideration therefore coming in aid to, and coinciding with the ſalutary alteration ariſing in the habit from the perſpiratory influence of a ſoft and warm climate, is perhaps the real cauſe of thoſe ſudden and happy changes attending ſea voyages in this ſpecies of pulmonary complaints.

Before I quit this part of my ſubject, as a ſpitting of blood is a very frequent, and ſometimes a formidable ſymptom attending this and ſome other diſorders of the lungs, I would beg leave to add an obſervation or two relating to it, and remark, that beſides occaſional bleedings to ſlacken the veſſels, the uſe of the bark, keeping the *primæ viæ* open, and ſometimes the neceſſary doſe of a quieting anodyne, I know by long experience there is not a more efficacious remedy for this alarming ſymptom than half a drachm of nitre, taken two or three times a day in a glaſs of water; the coolneſs it produces, and the quiet and tranquillity ſuperinduced by removing the orgazm, and that fretfulneſs of blood which, in a hectic fever, ſo generally attends this complaint, being really amazing.

There is alſo a circumſtance or two of very great conſequence to be attended to by tender people, who, from a hectic habit and thin veſſels, are ſubject to this alarming complaint; and which, as my own experience has made me particularly attentive to this diſorder, I cannot help mentioning and recommending. Firſt then, I would warn the patient againſt the miſchievous tendency of ſtooping much, as in the act of buckling his ſhoes, &c. He ſhould never walk, particularly up ſtairs, quick; nor, in ſhort, exert himſelf in any action that may have an apparent tendency to increaſe the power of the heart, or conſiderably quicken the circulation; but, on the contrary, ſhould regulate all his motions with an equable and uniform tranquillity.

There is likewiſe a ſymptom which frequently occurs, and precedes the rupture of a veſſel in the lungs, that is worth his particular attention, and which, perhaps, without it, might eſcape his notice. As thoſe hæmorrhages in a hectic habit have frequently a tendency in ſome meaſure critical, ſo there is of courſe ſome little diſorder excited in the circulation, or an effort in the conſtitution preceding them. This diſcharge therefore, more eſpecially in ſpittings of blood that are at all periodical, is often foreſhewn ſome time before by a certain confuſion and indiſtinctneſs of viſion, inſomuch that objects, when looked at ſteadily, do not appear ſharp and defined. Inebriation is ſometimes followed by the ſame temporary effect, and, perhaps, from the ſame cauſe too, which is probably ſome little ſtretch of the capillary blood-veſſels that accompany the optic nerve in its paſſage through the foramen to the eye. As ſoon as this ſymptom is perceived, which it frequently will be if the attention is always alive to it, eſpecially as we remarked in the caſe of a periodical hæmoptoe, it will be adviſeable to ſlacken the veſſels, and to prevent the rupture of the blood from the lungs, by letting it out at the arm; after which a doſe or two of nitre, and ſome gentle laxative medicines, followed with about an ounce of diacodium in the evening, will be extremely uſeful.

There is another conſideration alſo that is deſerving of his notice. Coſtiveneſs, in this diſorder, is found to be peculiarly prejudicial; and indeed it ſhould ſeem reaſonable to ſuppoſe that it would be ſo from the combined operation of two cauſes, both apparently pernicious. Firſt, from that fulneſs of the blood-veſſels always accompanying this ſtate of the conſtitution; and, ſecondly, from the ſtrain upon them in this diſtended condition, by the neceſſary exertion employed in forcing off the fæces when they are in an indurated ſtate.

The firſt is certainly a conſideration of great practical conſequence; but the ſecond is, in fact, not ſo formidable a circumſtance as one ſhould ſuppoſe at firſt ſight: for if this exertion, or any other force of the kind, is employed when the lungs are ſomewhat inflated, or with the precaution of what is commonly called holding the breath, and which, under thoſe circumſtances, is ordinarily done, it will in ſome meaſure, and during the time it laſts, by leſſening the diameter of the pulmonary blood-veſſels, produce the effect of a temporary ligature on the ruptured one; for though, when the lungs are ordinarily expanded, the blood paſſes moſt freely through the pulmonary artery, yet when the glottis is ſhut, and under full inſpiration, the abdominal muſcles, diaphragm, &c. preſs ſtrongly upon, and conſequently condenſe the impriſoned air in the lungs, as in the act of vomiting or forcing off the fæces, the pulmonary veſſels become ſo conſiderably ſtreightened by the compreſſed air in the veſicles, and the circumambient preſſure on the ſurface of the lungs without, that leſs blood paſſes through them in thoſe circumſtances than at any other time. This is the true reaſon why vomits in a *ſputum ſanguinis* are always ſafe, and perhaps may be partly the cauſe too why they are ſometimes an uſeful remedy.

Whoever chuſes to be convinced of the truth of the above obſervation, may be ſo in its full extent, and to a demonſtration, by an experiment always in his power: for when the lungs are expanded to the utmoſt, if at the height, and as it were top of a full inſpiration, the glottis is ſuddenly ſhut, and the lungs are ſtrongly, and with violence, preſſed upon by the reſpiratory muſcles, as little or no blood, under thoſe circumſtances, then paſſes through the pulmonary artery, ſo little or none is returned through the correſponding vein to the left auricle of the heart, in conſequence of which the circulation becomes impeded, indeed almoſt impaſſable: accordingly, in a few ſeconds, the pulſe begins to ſink, and ſoon growing weaker, and at length thready, the motion of the heart, if the effort is reſolutely perſevered in, at laſt ſeems to ceaſe; and moſt probably, were it poſſible to continue the exertion, would continue to do ſo. But when, on opening the glottis, and ſuffering the compreſſed air to be diſcharged, the preſſure is taken off from the veſſels, by two or three violent efforts and palpitations of the heart, the circulation re-commences.

THIS preſſure upon the veſſels of the lungs, by the ſtrong and convulſive action of the muſcles of reſpiration on the air confined in them, is, in all probability, the immediate cauſe of death in the ordinary execution of hanging. And accordingly Mr. Cheſelden, in his Anatomy, page 176, remarks, that he hath found by certain experiments, that death is brought about, in this melancholy proceſs, no other way than by the interruption of the breath.

Thus much of the moſt formidable diſeaſe to which that important organ, the lungs, is ſometimes ſubject.

There are likewiſe other accidental cauſes of miſchief to them, which, though not always attended with mortal conſequences, are however productive of very troubleſome complaints.

If the lungs are not themſelves contaminated with diſeaſe, yet, if the cheſt, from a natural deformity, or by any other defect, is too much ſtreightened to admit of that free and complete expanſion of them which is neceſſary to perfect reſpiration, the whole quantity of perſpirable matter, aſſigned by the general œconomy of nature to their ſhare, is not completely breathed off, and by accumulating produces diſtreſſing effects.

Or, if the lungs themſelves were originally weak and flabby, or are become too much relaxed by accidental weakneſs or old age, the leakage through the pores of the pulmonary cells, from this preternatural defect, becomes ſo conſiderable, that the quantity of tranſuding lymph, even ſuppoſing the fluid inoffenſive in itſelf, and capable of transformation into vapour, can be no longer diſcharged by the ordinary reſpiration. Beſides, in this weak and flaccid ſtate of the organ, an excrementitious matter of a groſſer and pituitous kind, and which was never intended by nature to be ejected by evaporation, generally pervades the ſides of the pulmonary cells, together with the ordinary perſpirable matter: this, from the nature of its compoſition, is abſolutely incapable of being completely diſcharged by the uſual proceſs of reſpiration, and therefore remains in, and choaks up the cells of the lungs, till increaſing to a certain degree, and the thinner parts of it being gradually exhaled, the remainder becomes of a ſufficient denſity to be forcibly laid hold of by a ſtrong current of air; and then the organs of reſpiration being ſtimulated into a ſudden and convulſive effort, the glottis becomes ſhut, and the impriſoned condenſed air being acted upon ſtrongly by the reſpiratory muſcles, it ruſhes forward with violence and impetuoſity on the ſucceeding openings of the glottis, and, in the courſe of repeated efforts, carries off the offending matter with it. Thus, in thoſe circumſtances, is nature obliged to have recourſe to this occaſional preternatural exertion; and in this manner is a cough formed, which is to the lungs what vomiting is to the ſtomach.

As the ingreſs of the matter through the weak and flaccid ſides of the veſicles is as conſtant as the cauſe of it is permanent, thoſe occaſional diſcharges become neceſſary; and therefore this complaint is in ſome productive of an habitual cough; and in others, when it is to a great degree, of a conſtitutional and humoral aſthma.

This complaint ſeldom terminates in a conſumption, or is attended with fatal effects; and it is not uncommon for patients under this diſorder to lengthen out, with great care and caution, a valetudinary life to old age.

The beſt adapted palliative remedies to this defective reſpiration, after the attention that is conſtantly neceſſary to avoid occaſional miſchiefs from taking cold, and a ſpare diet, ſeem to be thoſe that encourage external perſpiration. Accordingly a dry invigorating air, in which the diſſolving principle is active, change of ſituation from a cold to a warmer climate, gentle exerciſe on horſeback, warm cloathing, and guarding the feet, particularly againſt cold, are exceedingly uſeful. And, from long experience, I cannot help recommending alſo what is perhaps equal to them all, as nothing better promotes perſpiration, the ſalutary friction ariſing from a flannel waiſtcoat worn next to the ſkin. As one diſcharge alſo generally leſſens another, it is found neceſſary that a coſtive habit ſhould be avoided by the occaſional uſe of ſome gentle eccopprotick.

THIS diſcharge of pituita, and the cough it produces, is not however always the conſequence of a fault in the organs of reſpiration alone, but frequently ariſes from a ſuperabundance of this matter in the habit, owing ſometimes to a cold, ſluggiſh, leucophlegmatic conſtitution, and a vapid blood; or, what is more frequently the caſe in this as well as many other chronic miſchiefs, to eating and drinking beyond the digeſtive powers of the ſtomach, and conſequently more than can be aſſimilated and converted to the purpoſes of life, or, which is the ſame, than is neceſſary to ſupply the demands of nature by recruiting the waſte occaſioned by exerciſe or labour; in ſhort, to too little labour or too much food. As this error therefore is frequently productive, not only of the miſchiefs more directly before us, but is often, I believe indeed generally, the cauſe of moſt other chronic diſorders, I ſhall reſerve the full conſideration of this ſource of diſeaſe to the laſt chapter, where, as I hope to ſhew that a luxuriant indulgence of the palate is attended with many miſchievous effects to the conſtitution, ſo the means of preventing them, as far as that cauſe is concerned, will of courſe offer itſelf to the reader.

CHAP.

## CHAP. III.

THOSE diſorders, upon which we have hitherto curſorily remarked, have had their origin from ſome defect either in the organs of reſpiration themſelves, or in the conſtitution. The moſt frequent and familiar diſorder, however, to which the lungs are ſubject, and that with which we are more immediately concerned, ariſes from without, when both the lungs and the conſtitution are ſuppoſed to be in a ſound ſtate; and that is the very common accidental complaint of a cough from taking cold; which, though the tender and delicate are moſt expoſed to it, ſcarcely any body totally eſcapes.

THAT the lungs do in fact ordinarily feel the ill effects of an obſtruction of external perſpiration, is too evident to require proof; nor can it be reaſonably expected to be otherwiſe: for though, as we remarked before, the part of perſpirable matter allotted to them to diſcharge, in the ordinary œconomy of nature, is conſiderably more than that which paſſes off through the whole ſuperficies of the ſkin, it, muſt, however, neceſſarily be, that when a larger quantity preſſes upon them than they were originally calculated to tranſmit, they will not be able to diſcharge it in the quiet, ſtated, and ordinary way.

THE cauſes of ſuppreſſed external perſpiration are ſo numerous, that I ſhall not attempt a particular ſpecification of them, as ſuch an enumeration would unneceſſarily lead to a length I would wiſh to avoid. However, we may certainly venture to ſay, in general, that this common diſeaſe, to which almoſt every body is more or leſs expoſed, is entailed upon us by the curſe of cloathing; for by the great care we take to keep ourſelves covered from the influence of the air, the ſkin acquires ſuch a ſenſibility to cold, that even a gentle breeze from Heaven, which in a ſtate of nature would breathe refreſhment, now frequently conveys to us the arrows of deſtruction.

Besides that, the anxious care and caution to which the tender and valetudinary ordinarily habituate themſelves, reduce the ſurface of the body almoſt to the condition of a ſenſitive plant. Unhappily too, the very means of warmth and additional cloathing which are employed to get rid of one cold, generally become the cauſe of, as they lay the foundation for, a ſubſequent one.

Those parts of the body which are conſtantly expoſed to the action of the air, we ſee ſcarcely ever ſuffer inconvenience from it. For this reaſon an Indian without cloaths at all, a woman in her neck and arms, and any body in the face and hands, ſeldom get cold; notwithſtanding, in thoſe ſeveral inſtances, as the ſkin muſt undoubtedly be ſuppoſed to have had originally the ſame perceptive faculty; the ſubſequent difference muſt have ariſen from different treatment.

In order to produce the miſchievous effects of ſuppreſſed perſpiration, experience ſhews it is not neceſſary that the agency which cauſes it ſhould be generally applied to, or act upon, the whole ſurface of the ſkin. A particular part of the body, which has been uſually covered, being by accident, or forgetfulneſs, expoſed; or a pointed ſtream of air, by ſtriking upon the neck or legs, in a warm room, will produce a cough, or a diſeaſed defluxion upon the lungs. But it muſt be obſerved, that this formidable effect cannot certainly be owing to the mere ſuppreſſion of that inconſiderable quantity of perſpirable matter which for excretion fell to the ſhare of the part ſo particularly expoſed, as it can by no means be equal to the ſevere effects ſo frequently felt from it in the organs of reſpiration.

INDEED, the firſt and ordinary notice we commonly receive of a ſuppreſſed perſpiration, is a proof that the corrugating action of the cold ſtriking upon a part of the body, is ſufficient, by a kind of general conſent, to produce its effects over the whole of it: for if, as in the inſtance juſt mentioned, the miſchief is brought on by a partial ſtroke of the air upon the legs when a perſon in a warm room happens to be expoſed to a ſtream of it, the firſt intimation we receive of the invading miſchief, though on the extremities of the body, is by the diſtant pituitory membrane of the noſe, as it frequently in a very few minutes (after the diſorder has firſt been ſhewn by a ſneezing) produces the ordinary ſymptom of a ſtuffing of the noſtrils. This ſpaſmodic irritation from the dripping pituita, or, if I may ſo expreſs myſelf, this cough of the naſal paſſage, and the thickening of its membrane to ſo great a degree as frequently to ſhut it almoſt entirely, could not, in the former circumſtances, have ariſen from the actual application of the cold to the membranes of the noſe. It therefore can be accounted for only by the general conſent of all the parts deſtined to a particular ſpecies of ſecretion.

It is alſo certain that the cough, or at leaſt the duration of it, ſo frequently ſucceeding a general ſuppreſſion of external perſpiration from a more extenſive application of cold, does not depend ſimply upon the additional diſcharge into the cells and bronchial ramifications, of juſt ſo much of the perſpirable matter as, ſuppoſing no ſuch obſtruction, would otherwiſe have tranſpired by means of the ſkin; for, were this the caſe, the cough would continue no longer than the lungs were oppreſſed with this additional burthen. But as the cauſe of this ſuppreſſion is ſudden, ſo probably it is only temporary, and on a removal of thoſe circumſtances which gave riſe to it, the perſpiratory proceſs goes on in the uſual way; at leaſt by warm covering and a plentiful ſweat, the lungs would ſoon be relieved from the additional quantity of the perſpirable matter with which they are ſuppoſed to be oppreſſed. On the contrary, we find the effect upon the ſkin, which is productive of the miſchief, though ſo ſudden and temporary, ſhall be followed by a cough, which will ſometimes harraſs the patient for a month after.

Though every cauſe, therefore, of a ſuppreſſed perſpiration, operating upon a particular part of the body, ſhould be attended with an immediate communication of its effects over all the external perſpirative powers of the whole ſkin, we may be well aſſured, by that ſoreneſs of the breaſt which frequently attends the convulſive ſhocks on the firſt invaſion of the cough, that the lungs feel the effects of the additional burthen thrown upon them, not ſimply by the actual diſcharge of the *materia perſpirabilis* into the cells of the lungs, but principally by its overcharging the ſecretory organs of the aſpera arteria, bronchia, and veſicles, as well as the pituitary membrane of the noſe, producing a kind of tumefaction, or thickening of the ſeveral parts, which for a time actually ſhuts up, almoſt entirely, the paſſage of the noſe, and provokes, by irritation, or an uneaſy ſtimulation in the throat, the perpetual and uſeleſs efforts of a petulant cough to diſcharge from the cavities of the lungs what, in the very early ſtate of the diſorder, is not in fact lodged in them, and which, firſt of all, ſerves only to harraſs the patient and injure the organ. For in this ſtate of the obſtruction, even ſuppoſing the ſtimulus not to ariſe wholly from the overcharged, tumid, and almoſt inflammatory ſtate of the membranes, the matter, however, while the remora laſts, which drills from them, is too thin to be laid hold of by a current of air; which therefore, in the impotent efforts of the cough, uſeleſsly ruſhes out of the lungs without conveying any thing with it, or producing any kind of expectoration.

THOUGH the conſequences of that cauſe which produces a ſudden ſuppreſſion of external perſpiration, are undoubtedly very often productive of the cough which we experience from taking cold, I am far from thinking that it always takes its riſe from this external agency. The application of cold damp air is moſt certainly as capable of producing an immediate miſchief to the internal ſurface of the reſpiratory organs, as to the external ſurface of the ſkin; i. e. we are ſurely as capable of taking cold on the lungs, as on the ſurface of the body.

It is well known that cold contracts animal fibres, inſomuch that animals are even reduced to leſs dimenſion by it.

Extreme cold alſo operates upon the human body as a ſort of ſtimulus, producing a pricking ſenſation, which is followed afterwards by a glowing heat, and which, as far as it goes, is a ſmall degree of inflammation in the parts expoſed to it.

If therefore the effects of cold air are ſo conſiderable upon the ſurface of the body, how much more ſenſibly muſt its effects be felt by the lungs when it is contraſted by much hotter blood in very thin veſſels, and thoſe in immediate contact with the inſpired air? We cannot therefore wonder that cold, by contracting the fibres, and cooling the blood too much in thoſe veſſels which are expoſed to the air, ſhould ſuppreſs ſome of the groſſer parts of the perſpirable matter, and conſequently, that many ſalts, which would otherwiſe in a warm air be gradually evaporated, ſhould then be retained. From hence, and the obſtruction to the free diſcharge of the mucus from thoſe glands with which the aſpera arteria is ſo thickly diſſeminated, it is more than probable that the whole pituitary membrane becomes thickened, dry, and in ſome meaſure inflamed. That this is the real ſtate of the internal ſurface of the reſpiratory organs on the commencement of a cold, while the remora laſts, and before the glands have unloaded themſelves by leaking off the obſtructed muſcus, we may be very ſure from the actual pain and ſoreneſs which, on the firſt notice of the diſorder, the cough occaſions through the whole windpipe and breaſt.

THIS injury very frequently happens when, after having ſat ſome time in a room where, either by a large fire or a great deal of company, the ſurface of the lungs has been accuſtomed to a ſoft warm air, a perſon expoſes himſelf, on going out of it, to a cold biting atmoſphere, and more particularly ſo when it is loaded with cold vapour. If, in theſe circumſtances, the precaution is not taken of putting a handkerchief before the mouth and noſtrils, that the air, at the ſame time that it is meliorated or warmed before it enters the lungs, may alſo be as it were ſtrained from the humid vapour with which it is loaded, the pernicious conſequences of the ſudden change are generally felt upon the breaſt.

We have a demonſtrative proof that the lungs may in this manner catch cold, or that damp cold air is capable of producing thoſe immediate miſchiefs in the organs of reſpiration, from the effects attending the improper uſe of the inhaler, which I am about to deſcribe and recommend for the cure of this cough; for if, out of curioſity, any trial is inadvertently made with cold inſtead of hot water, the air which enters the lungs, by paſſing through the water, acquires ſuch a coldneſs, and is ſo loaded with vapour, that an experiment of a few minutes will ſeldom fail to produce a ſevere cold in the lungs, and a very troubleſome cough in conſequence of it.

But whether this ſpecies of injury to the lungs is always the effect of ſuppreſſed external perſpiration, either partially or generally produced, or, what is much more probable, ſometimes owing to the immediate action of a cold damp air on the pituitary membrane that lines the ſurfaces of the reſpiratory organs, the cough that is the conſequence of either is preciſely that to which the remedy I now propoſe is peculiarly adapted, and for which, in its recent ſtate, it is an expeditious and infallible cure.

The tickling uneaſy ſenſation which produces thoſe ineffectual efforts, ordinarily comes on within a few hours after the cold is taken; and this ſpecies of cough is particularly diſtinguiſhed by a ſoreneſs quite through the aſpera arteria, extending ſometimes to the lungs themſelves; but is more particularly felt at the lower part of the windpipe, about the junction of the clavicles. This ſymptom is, when the ſeizure is ſevere, ſometimes very diſtreſſing; inſomuch that, in the act of coughing, the internal ſurface of the organ is ſo tender, that it ſeems, as it were, to be harrowed up, and even ſtripped off by the agitation.

In what manner this remedy produces its ſalutary and ſudden effects, I ſhall not attempt to inveſtigate. My deſign is, principally, practical information. Yet I cannot help juſt obſerving, that if relaxing and eaſing the parts which are overcharged, and conſequently a reſolution of the obſtructions formed in them, is likely to remove the inflamed and thickened ſtate of the pituitary membrane, and the conſequent irritation produced from this diſeaſed ſtate of it, no proceſs ſeems better calculated for the purpoſe.

Indeed, it was from a conviction that the Catarrhous Cough aroſe from ſome degree of actual inflammation in the pituitary lining of the organs of reſpiration, that the idea of this ſpecies of cure was firſt ſuggeſted; for if the diſorder of the membrane is only the effects of a cauſe which is topical, ſudden, and temporary, it becomes reaſonable to ſuppoſe that a well-adapted local remedy would be productive of the ſame good conſequences in this as in any other ſpecies of inflammations. In this view, the two great indications would be, to prevent as much as poſſible the irritation ariſing from the convulſive ſhocks of the cough on the inflamed parts, and to remove the inflammation itſelf by ſuch emollient applications as could conveniently be adminiſtered to them.

Those intentions are thoroughly anſwered by opium, and by inhaling warm ſteams into the lungs; for by the firſt, the internal ſurface of the aſpera arteria and bronchiæ are, during the effect of the medicine, rendered in a great meaſure inſenſible to the miſchievous irritation, to which they would otherwiſe be ſubject; and the application of the warm vapour, under the protection of the opiate, by acting like a fotus, and in oppoſition to the very cauſe by which the diſorder was produced, reſolves the inflammation, by unloading the turgid capillaries of the pituitary membrane.

WHETHER this reaſoning be admitted or not, the fact is paſt diſpute, that the conjoined powers of thoſe agencies are a ſure, and, in general, an immediate cure. But in order to experience the certain advantages of this remedy, it is not only neceſſary that the ſpecies of cough for which it is peculiarly calculated ſhould be exactly aſcertained, but it is alſo to be remarked, as eſſential to the ſure and ſpeedy effect of it, that the remedy ſhould be applied as ſoon as poſſible after the invaſion of the diſorder. If, for inſtance, the cold is caught in any part of one day, the proceſs ſhould not be delayed longer than the evening of the ſame day, or at moſt that of the ſucceeding one; for though its effects are not ſo much confined as to be uſeleſs at a greater diſtance of time, yet when the miſchief the lungs have received has been confirmed by time, and the inflammatory tendency is poſſibly increaſed and aggravated by the determination of any floating acrimony in the habit to the injured parts, which, under thoſe circumſtances, is generally the caſe, the cure will not be ſo ſudden; but it will be then ſometimes neceſſary to repeat both opiate and inhaler the ſucceeding morning, when the effects of the former doſe are exhauſted, which is uſually about eight or ten hours after. In this caſe, the greateſt part of the ſame day ſhould be ſpent in bed; and the patient may be aſſured that his perſeverance will be rewarded with eaſe and comfort the ſucceeding night, and ſubſequently, if the remedy has not been too long delayed, with almoſt a certain cure of his diſorder. So likewiſe, if the firſt attack is uncommonly ſevere, and the injury the wind-pipe and lungs have received is very conſiderable and diſtreſſing, more eſpecially if the remedy has been delayed till the ſecond night after the ſeizure, a repetition of the medicine will be ſometimes equally neceſſary, and be uſually attended with the ſame ſucceſs.

But when the inhaler is uſed in the very recent and ordinary ſtate of the cough, viz. the evening of the attack, the patient is ſure of being ſurpriſed with an immediate cure; ſo ſudden indeed, that it is more than probable he will cough no more, except once or twice perhaps the ſucceeding morning, to diſcharge what is drilled into the branches of the bronchiæ, and which, as the thinner parts have during the night evaporated, is eaſily, and with a very gentle effort, ſpit off in a concocted ſtate.

Indeed the effect of this remedy is ſo very ſudden and certain, when uſed the ſame day the cold is contracted, that it was with difficulty, and not till after ſeveral trials, that I could myſelf credit the reality of the cure. As I have all my life, from tender lungs, had a propenſity, on taking cold, to a cough of this ſort, (which, in the ordinary courſe of it, uſed to harraſs me for three weeks or a month, and ſometimes much longer) I was myſelf the firſt ſubject of the experiment. The night the remedy was firſt uſed was paſſed without the leaſt tendency to cough; and the next morning, by one or two very gentle efforts, a ſmall quantity of concocted matter was diſcharged, without the leaſt diſpoſition to cough afterwards; notwithſtanding which, I could not be perſuaded the whole ſucceeding day that the cough was radically cured, and accordingly, was in conſtant expectation of its return. However, it did not return, nor has it ever done ſo in a ſingle inſtance out of the great numbers that have been cured by this remedy, where the application was made in the recent and ordinary ſtate of the diſorder.

After trying the effects of various pectoral ingredients, I found the vapour of none of them ſo inoffenſive and grateful to the lungs as that from ſimple warm water. This part of the cure therefore ſeems to be nothing but the conſequence of ſoft and ſudden relaxation from mere warmth and moiſture.

Before I enter upon the directions for the cure of this ſpecies of cough, it will be neceſſary to give a general deſcription of the Inhaler; a more particular account of which, accompanied with a drawing for the inſtruction of the workman, is added at the end of this chapter.

The body of the inſtrument holds about a pint; and the handle, which is fixed to the ſide of it, is hollow. There is in the lower part of the veſſel, where it is ſoldered to the handle, a hole, by means of which, and three others on the upper part of the handle, the water, when it is poured into the Inhaler, will riſe to the ſame level in both. To the middle of the cover a flexible tube, about five or ſix inches long, is fixed, with a mouth-piece of wood or ivory. Underneath the cover there is a valve fixed, which opens and ſhuts the communication between the upper and internal part of the Inhaler and the external air, for a purpoſe which ſhall be preſently explained.

When the mouth is applied to the end of the tube in the act of inſpiration, the air ruſhes into the handle, and up through the body of warm water, and the lungs become, conſequently, filled with hot vapour. In expiration, the mouth being ſtill fixed to the tube, the breath, together with the ſteam on the ſurface of the water in the Inhaler, is forced up through the valve in the cover. In this manner therefore the whole act of reſpiration is performed through the Inhaler, without the neceſſity, in the act of expiration, of either breathing through the noſe, or removing the pipe from the mouth. The uſe of this conſtruction of the inſtrument will be ſhewn hereafter.

HAVING premiſed thus much, we ſhall proceed to the uſe of this apparatus, after once more repeating the caution of not trying the experiment on the Inhaler with cold water, as it will certainly produce the complaint for which it is here propoſed as a remedy.

IN the evening, a little before bedtime, the patient, if of adult age, is to take three drachms, or as many tea ſpoonfuls of Elixir Paregoricum, in a glaſs of water: if the ſubject is younger, for inſtance under five years old, one tea ſpoonful; or within that and ten years, two. [Each tea ſpoonful contains ſomewhat leſs than 1 quarter of a grain of opium.] About three quarters of an hour after, the patient ſhould go to bed, and being covered warm, the Inhaler three parts filled with water nearly boiling (which from the coldneſs of the metal, and the time it ordinarily takes before it is uſed by the patient, will be of a proper degree of warmth) and being wrapped up in a napkin, but ſo that the valve in the cover is not obſtructed by it, is to be placed at the arm-pit, and the bed-cloaths being drawn up and over it cloſe to the throat, the tube is to be applied to the mouth, and the patient ſhould inſpire and expire through it about twenty minutes, or half an hour.

It is very evident, as the whole act of reſpiration is performed through the machine, that in inſpiration the lungs will be filled with air which will be hot, and loaded with vapour, by paſſing through the body of water; and in expiration, all that was contained in the lungs will, by mixing with the ſteam on the ſurface of the water, be forced through the valve in the cover, and ſettle on the ſurface of the body under the bed-cloaths.

The great uſe of this particular conſtruction of the Inhaler is this. Firſt, as there is no neceſſity, at the end of every inſpiration, to remove the tube from the mouth, in order to expire from the lungs the vapour which had been received into them, this machine may therefore be uſed with as much eaſe by children as elder people.

And, ſecondly, as a feveriſh habit frequently accompanies the diſorder, the valve in that reſpect alſo is of the utmoſt importance; for a ſweat, or at leaſt a free perſpiration, not only relieves the patient from the reſtleſs anxiety of a hot, dry, and ſometimes parched ſkin, but is alſo, of all others, the moſt eligible evacuation for removing the fever; and it will be generally found that, after the Inhaler ſo conſtructed hath been uſed a few minutes, the warm vapour under the cloaths will, by ſettling upon the trunk, produce a ſweat, which will gradually extend itſelf to the legs and feet.

In a catarrhous fever, or any feveriſh habit attending this cough, it would be proper to take a draught of warm thin whey a few minutes before the Inhaler is uſed; and after the proceſs is over, the ſweat which it has produced may be continued by occaſional ſmall draughts of weak warm whey, or barley water. The ſweating is by no means ſo neceſſary to the cure of the Catarrhous Cough, as that the ſucceſs of the Inhaler againſt that complaint at all depends upon it; yet I cannot help once more remarking, that when this diſorder happens to be accompanied with a feveriſh habit, the advantages of this particular conſtruction will be very important.

After this reſpiratory proceſs is over, the patient uſually paſſes the night without the leaſt interruption from the cough, and feels no farther moleſtation from it than, as I obſerved before, once or twice in the morning to throw off the trifling leakage which, unperceived, had dripped into the bronchiæ and veſicles during the night; the thinner parts of which being evaporated, what remains is ſoon got rid of with a very gentle effort.

I CANNOT, however, take leave of this part of my ſubject, without pointedly obſerving, that if the patient means not to be diſappointed by my aſſurances or his own expectations, it is eſſentially neceſſary that the preceding remarks, with regard to the time and manner of uſing this proceſs, ſhould be ſtrictly attended to. I will beg therefore once more to repeat, FIRST, That as tender valetudinary people are but too well acquainted with the firſt notices of the diſorder, the remedy muſt, or ought to be, uſed the ſame evening, which will, in an ordinary ſeizure, be attended with an immediate cure; but if the ſoreneſs of the reſpiratory organs, or the petulance of the cough, ſhew the cold which has been contracted to have been very ſevere, the Inhaler, without the opiate, ſhould be again repeated for the ſame time the next morning.

SECONDLY, If the uſe of the Inhaler, &c. is delayed till the ſecond night, it will be always right to repeat it again the next morning without the opiate, but with it if the ſeizure has been violent.

And, laſtly, If the cough is of ſome days ſtanding, it will be always neceſſary to employ both parts of the proceſs at night and the ſucceeding morning, as the firſt ſimple inflammatory miſchief is now moſt probably aggravated by an additional one of a chronic tendency.

I shall conclude this chapter with obſerving, that if through the want of a timely application, or a total neglect of this or any other remedy, the cough ſhould continue to harraſs the patient, it is, particularly in delicate and tender conſtitutions, of the utmoſt conſequence to attempt the removal of it as ſoon as poſſible, before any floating acrimony in the conſtitution (from the perpetual irritation) receives an habitual

tual determination to an organ ſo eſſential to life as the lungs.

If the patient expectorates with eaſe and freedom a thick and well-digeſted inoffenſive phlegm, there is generally but little doubt of his ſpitting off the diſorder, with common care, in a few days; and till that is accompliſhed, a proper doſe of elixir paregoricum for a few ſucceſſive nights will be found very uſeful in ſuppreſſing the fatiguing irritation and ineffectual cough, occaſioned by a matter which, dripping in the early ſtate of the diſeaſe into the bronchiæ during the night, is commonly at that time too thin to be diſcharged by thoſe convulſive efforts.

If, however, notwithſtanding a free and copious expectoration, the cough ſhould ſtill continue, and the diſcharge, inſtead of removing the complaint, ſhould itſelf, by becoming a diſeaſe, be a greater expence than the conſtitution can well ſupport, it is poſſible that a tender patient may ſpit off his life through a weak, relaxed pair of lungs, without the leaſt appearance of purulence, or any ſuſpicion of ſuppuration. In thoſe circumſtances, beſides, as was mentioned before, increaſing the general perſpiration by the ſalutary friction of a flannel waiſtcoat, change of ſituation, and more eſpecially long journies on horſeback, conducted as much as poſſible through a thin, ſharp, dry air, will ſeldom fail of removing the complaint.

But, on the contrary, if the cough ſhould, at the ſame time that it is petulant and fatiguing to the breaſt, continue dry, huſky, and without expectoration; provided there is reaſon to hope that no tubercles are forming, or yet actually formed, there is not perhaps a more efficacious remedy for it than half a drachm of gum ammoniacum, with eighteen or twenty drops of laudanum made into pills, and taken at bed-time, and occaſionally repeated. This excellent remedy Sir John Pringle did me the honour to communicate to me, and I have accordingly found it, in a great many inſtances, amazingly ſucceſsful, and generally very expeditiouſly ſo, for it ſeldom fails to produce an expectoration, and to abate the diſtreſſing fatigue of the cough. In thoſe circumſtances I have likewiſe found the common remedy of ʒſs or ʒij of Balſ. Sulph. Aniſat. taken twice a day, in a little powdered ſugar, or any other vehicle, a very efficacious one. I have alſo, many times, known a ſalutary revulſion made from the lungs by the ſimple application of a large plaiſter, about five or ſix inches diameter, of Pix Burgund. between the ſhoulders; for the perſpirable matter, which is locked up under it, becomes ſo ſharp and acrid, that in a few days it ſeldom fails to produce a very conſiderable itching, ſome little tendency to inflammation, and, very frequently, a great number of boils. This application ſhould be continued (the plaiſter being occaſionally changed) for three weeks, or a month, or longer, if the complaint is not ſo ſoon removed.

And here I cannot help obſerving, that though ſeemingly a trifling, it is, however, by no means a uſeleſs caution to the tender patient, not to expoſe his ſhoulders in bed, and during the night to the cold; but when he lies down to take care they are kept warm by drawing the bed-cloaths up cloſe to his back and neck.

If, however, notwithſtanding theſe and other means, the cough, continuing dry or unattended with a proper expectoration, ſhould perſevere in harraſſing the patient; if, at laſt, it ſhould produce, together with a ſoreneſs, ſhooting pains through the breaſt and between the ſhoulders, attended alſo with ſhortneſs of the breath; and, if added to this, fluſhes of the cheeks after meals, ſcalding in the hands and feet, and other ſymptoms of a hectic, ſhould accompany the diſorder, there is certainly no time to be loſt, as there is the greateſt reaſon to apprehend that ſome acrimony in the habit is determined to the tender ſubſtance of the lungs; and that, conſequently, tubercular ſuppurations will follow. In this critical and dangerous ſituation, I think I can venture to ſay from long experience, that, accompanied with occaſional bleedings, the patient will find his greateſt ſecurity in a drain from a large ſcapulary iſſue, aſſiſted by a diet of aſſes milk and vegetables *.

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* Vide page 63.

## CHAP. IV.

### *On the* Vis Vitæ, *ſo far as it is concerned in preſerving or re-inſtating the Health of an Animal.*

IN the moſt perfect piece of mechaniſm that was ever contrived by man, the utmoſt expectation of the mechanic has always been confined to the hopes that, by the agency of ſome mode of power, his machine might continue to anſwer the purpoſe of its intention, 'till diſabled by a gradual wear of the materials with which it was conſtructed, a period ſhould be at laſt put to the effects of his ſkill.

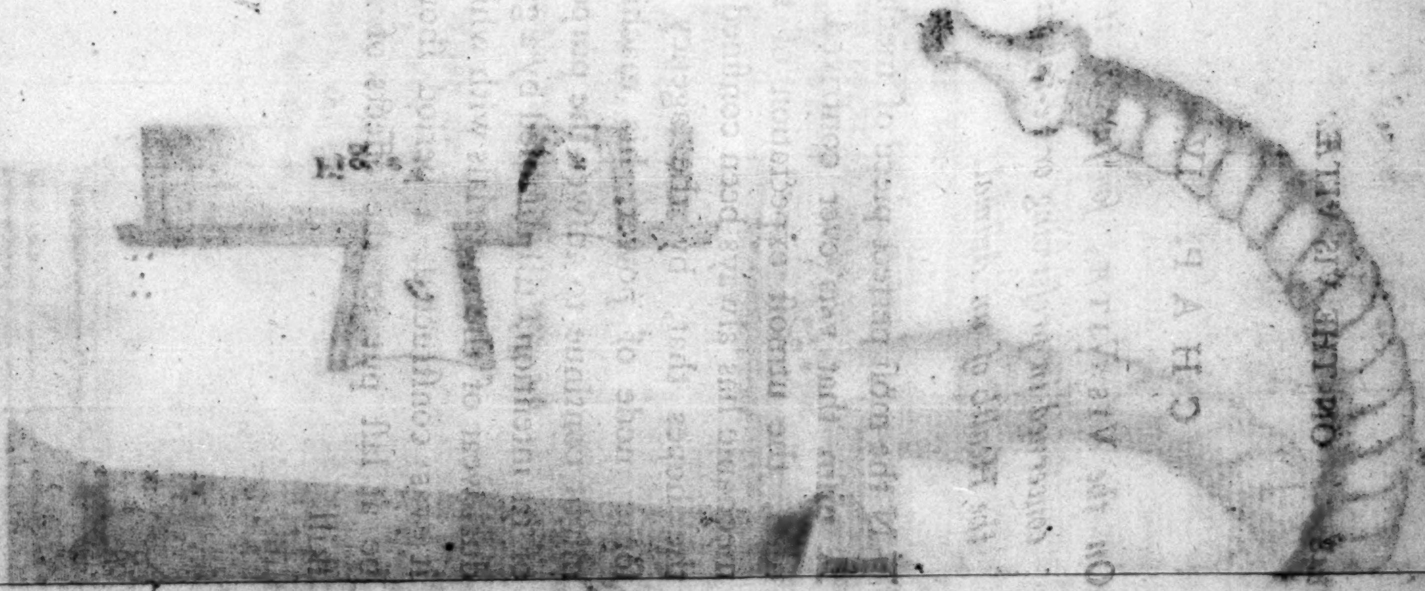

Fig.

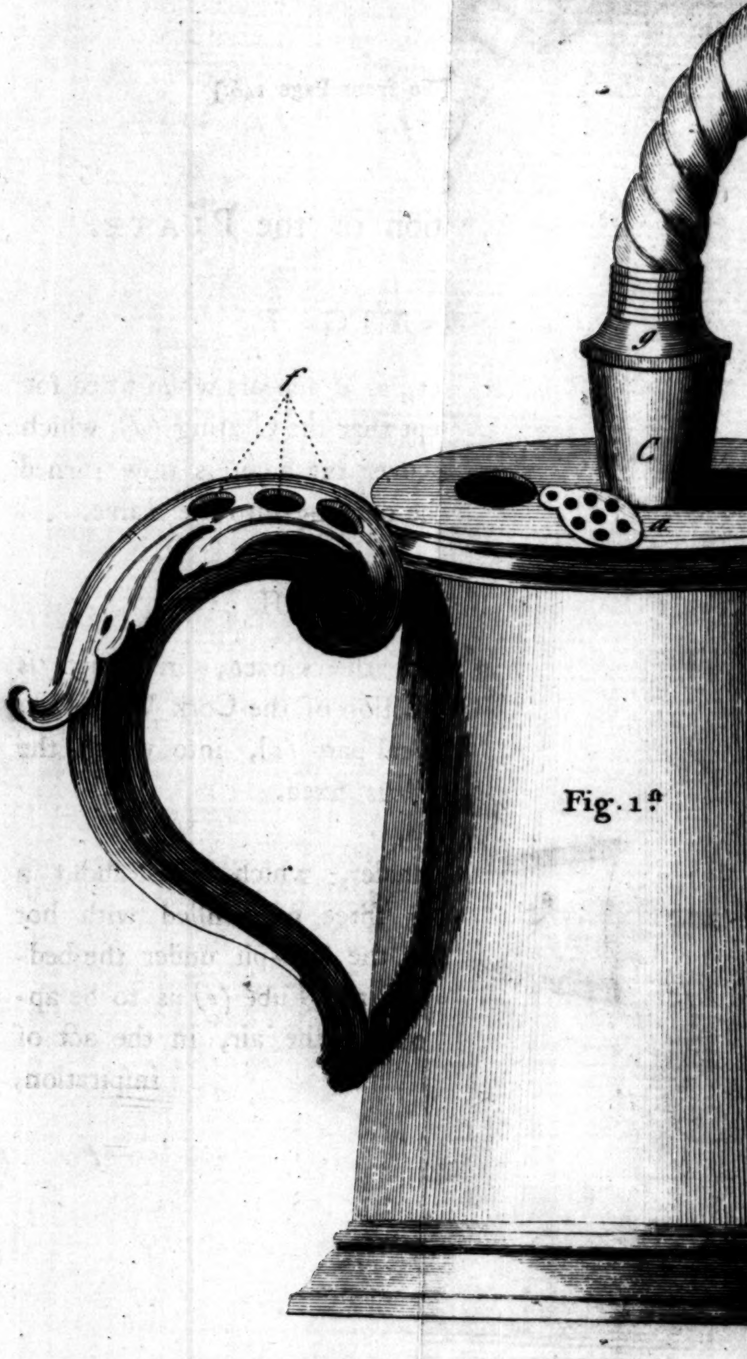
Fig. 1.ª

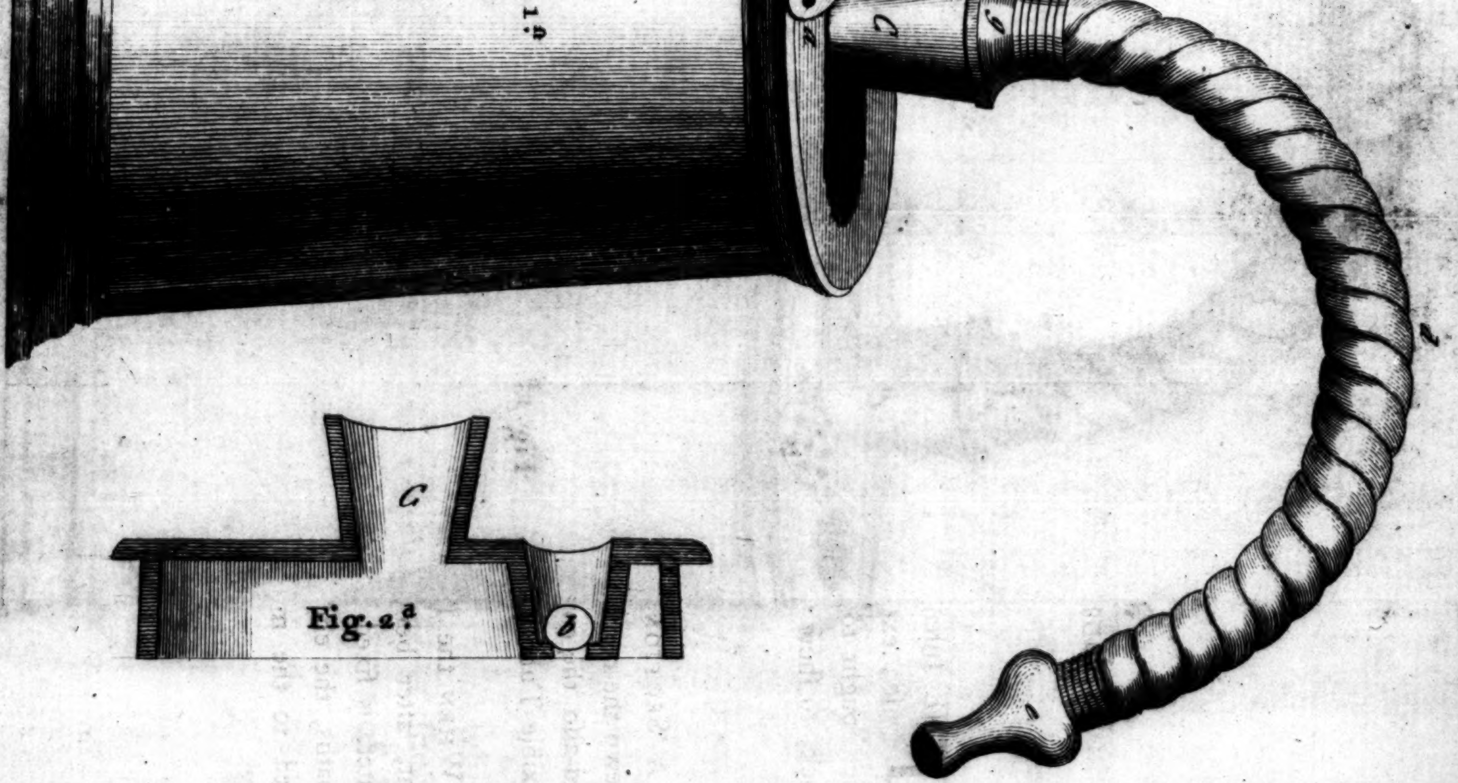

Fig. 1st

Fig. 2d

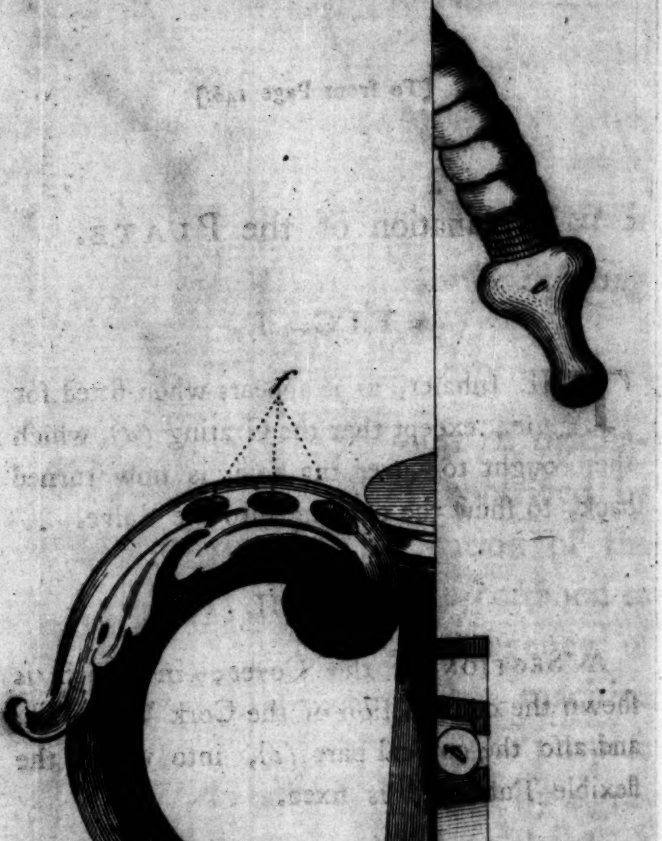

Fig. 2.

[To front Page 146.]

## Explanation of the PLATE.

### FIG. I.

THE Inhaler, as it appears when fitted for uſe; except that the Grating *(a)*, which then ought to cover the hole, is now turned back, to ſhew the opening into the Valve.

### FIG. II.

A SECTION of the Cover; in which is ſhewn the conſtruction of the Cork Valve *(b)*; and alſo the conical part *(c)*, into which the flexible Tube *(d)* is fixed.

WHEN the Inhaler, which holds about a pint, after being three parts filled with hot water, is fixed at the arm-pit under the bed-cloaths, the end of the Tube *(e)* is to be applied to the mouth; the air, in the act of inſpiration, then ruſhes into the Apertures *(f)*, and paſſing through the hollow handle, and afterwards into a hole in the lower part where it is ſoldered to the body, and therefore cannot be repreſented, it riſes through the hot water, and is received into the lungs, impregnated with vapour. In expiration, the contents of the lungs are diſcharged upon the ſurface of the water; and inſtead of forcing the water back through the hollow handle, the air eſcapes by lifting the round light Cork Valve *(b)*, ſo as to ſettle upon the ſurface of the body, under the bed-cloaths.

THUS the whole act of reſpiration is performed, without ever removing the inſtrument from the mouth.

THE flexible part of the Tube *(d)* is about ſix inches long, fitted with a wooden mouth-piece *(e)* at one end, and a part *(g)* of the ſame materials at the other, to be received into the Cone *(c)* on the cover. This flexible tube is made by winding a long ſlip of ſilk oil-ſkin oil-ſkin over a ſpiral braſs wire. This ſhould be then covered with one of the ſame ſize, of thin ſilk, and both be ſecured by ſtrong ſewing ſilk wound ſpirally round them. Some length and degree of flexibility is neceſſary to this tube, for the ſake of a convenient accommodation to the mouth when the head is laid on the pillow.

Care ſhould be taken by the workman, that the cover ſhould be made ſo as to fit very exactly; or, if it does not do ſo, the defect ſhould be remedied by winding a piece of cotton wick, or ſome ſuch contrivance, round the rim underneath the cover, ſo as to make it air-tight. The Cork, likewiſe, which forms the Valve, ſhould be made, for the above reaſon, as round as poſſible. It is alſo neceſſary to remark, that the area of the holes, on the upper part of the handle, taken together; the ſize of the hole in the lower part of the handle, which opens into the Inhaler; the opening of the conical Valve itſelf; and that in the mouth-piece, as well as the cavity or inſide of the flexible Tube, ſhould be all equally large, and of ſuch dimenſions, as to equal the ſize of both noſtrils taken together: in ſhort, they ſhould be, ſeverally, ſo large, as not only not to obſtruct each other, but that reſpiration may be performed through them with no more labour than is exerted in ordinary breathing.

N. B. It is neceſſary to obſerve, that care ſhould be taken, when the Inhaler is in uſe, that the ingreſs and egreſs of the air through the holes on the top of the handle, and thoſe in the grating on the cover, ſhould not be interrupted by the bed-cloaths.

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☞ The Inhalers are to be purchaſed of *W. Barnes*, Pewterer, No. 157, Fleet-ſtreet.

We never find in the beſt deſigned, and moſt complicated reſult of human workmanſhip, even an attempt to impart to it any principle, or proviſion, for ſupplying in the conſtituent parts the conſequences of that waſte and wear, which muſt be the neceſſary effect of continued motion.

Besides this principle of imperfection, every production of art is equally unprovided alſo with the means of repairing any injury it may ſuffer, either from external violence, or the internal accidents to which it is always ſubject, from the unavoidable imperfection of materials; and either of thoſe events is capable of defeating the deſign and labour of the inventor; for, if once its motion is deſtroyed, though by the moſt trifling defect, the conſequence becomes as permanent as the cauſe, and the machine is rendered uſeleſs.

It is the union of thoſe important reſources of *ſupply* and *renovation*, poſſeſſed by animal nature, which conſtitutes that effort as it were towards immortality, ſo peculiarly characterizing the works of the Creator. In this reſpect, exclusive of an infinity of others, the moſt contemptible reptile is infinitely ſuperior to the moſt perfect and elaborate performance of man.

The operation of this renovating agency is, indeed, ſo apparent and efficacious in animal life, that phyſicians have been led to conſider, or at leaſt to talk of it, as a principle almoſt poſſeſſing cogitation; and, as it were, a genius preſiding over the health and well-being of the animal. Thus, under the name of Nature, it is ſaid to be the curer of diſeaſes.—That Nature relieved the conſtitution from the offenſive matter, by this or that critical diſcharge, as the beſt adapted to the purpoſe. — Hence alſo the ſeveral expreſſions, that Nature is kind, or acts wiſely.—Nature muſt not be oppoſed; but at moſt be gently checked; or, if in a languid ſtate, aſſiſted. Theſe expreſſions, I ſay, which are the reſult of experience and long obſervation, are certain proofs that animal life is poſſeſſed of a very active principle, which efficaciouſly exerts itſelf towards its preſervation.

And, indeed, if we take a view of the creation at large, we ſhall find that this principle of ſelf-preſervation, or that effort towards a perpetuity of exiſtence, is not confined to animal, or even to vegetable life: we ſhall perceive it extending itſelf into a univerſal law; equally impreſſed upon, and pervading, every individual of the creation; and operating in each in a mode adapted to the nature of its exiſtence. Thus, if we deſcend to the very loweſt order of material exiſtence, it will be found, that even the mean and common materials of which our earth is compoſed, abhor annihilation: theſe, under the ſimple agency of neceſſity, maintain their form and being by a ſtrong coheſive attraction, and a ſuperadded principle of gravitation, impreſſed upon them towards the common centre; inſomuch that, by the univerſality of this active bond of union, the being of the whole depending upon and being ſupported by the ſame power which is equally poſſeſſed by the ſmalleſt and moſt contemptible atom, the earth is preſerved intire; ſo that not a particle is loſt to it, from the creation to the preſent hour.

If from the loweſt we aſcend to the next order of exiſtence, we find the parts of which the individuals of it are compoſed, involve not only the *inferior* and *ordinary* powers of union, by a gravitation in common with the earth, but poſſeſs alſo the ſuperadded privileges of a ſpecific or elective attraction to thoſe of their own kind; ſuch are thoſe of the metallic ſort, and the whole tribe of foſſils, &c. Theſe, therefore, are endowed with a nature ſuperior to the former; but, as their active principles of exiſtence and ſelf-preſervation are ſimple and determined, and therefore well underſtood, theſe alſo are ſaid to be influenced and preſerved by the agency of neceſſity.

If we proceed on to the order of vegetables, the cauſes of their ſpecific exiſtence, accretion, and growth, are more complicated, and, of courſe, leſs comprehenſible. For this ſpecies of exiſtence not only involves in its nature the powers of the two former, viz. the ordinary gravitating principle of groſs matter, and that elective attraction poſſeſſed by the metallic kind, but it is neceſſary alſo that the plant ſhould, by a well-adapted organization of its various parts, be poſſeſſed of ſuch powers of communication with its parent earth, as may qualify it for the appropriation or admiſſion of ſuch ſubſtances, and ſuch only, as are ſuited to its more complicated nature. However, though the cauſes of its growth and preſervation are, by being further removed from our comprehenſion, ſublimated into the general idea of life, yet we do not, even here, loſe ſight of neceſſary agency in the ſeveral parts which compoſe the plant; and as a large train of neceſſary cauſes and effects, concerned in its growth, are expoſed to our cognizance, we take it for granted that thoſe which are hidden from us are of the ſame nature.

BUT, if we extend our view ſtill higher into the animal part of the creation, we there find, ſuperadded to all the former properties of the plant, and to an organization infinitely ſuperior, locomotive powers, and an internal principle for the direction and employment of them. As the ſubject, therefore, and the whole complication of cauſes and effects, are infinitely beyond our comprehenſion, the idea of neceſſity now ceaſes, and that of liberty, depending upon volition, begins: and as the nature of exiſtence is become more myſterious, ſo the means of perpetuating it are more extenſive; for, as a greater variety of combined cauſes are concerned in the ſupport and formation of an animal, ſo the reſources for its preſervation, and the means of its deſtruction, are proportionally multiplied.

HENCE as, with reſpect to vegetable life, the earth is the great baſis which contains, and from which are extracted, all the various principles which are neceſſary to the infinite variety of plants, as well as the particular parts of each individual: as the earth muſt poſſeſs what, by the ſpecific organization of plants, is convertible into their ſeveral peculiar properties, from the juice of the deadly nightſhade, up to that of the delicious anana; ſo the blood, the great pabulum of all animal ſecretion, muſt be ſo compounded as to involve all thoſe principles which, by the configuration of the ſecretory organs, are convertible into the various fluids which are neceſſary to animal life. It is therefore neceſſary that this fluid ſhould not only be ſupported, and occaſionally recruited, by ſuch materials as are adapted to this important end; but that it ſhould be preſerved, likewiſe, from foreign contamination: and as the plant is actually ſo formed, by the configuration of the parts deſtined to nutrition, as to receive, and at the ſame time exclude what is, reſpectively, proper for its ſupport, or deſtructive to its nature; ſo the animal muſt be poſſeſſed of powers and perceptions, for chooſing the one and avoiding the other.

Such powers of diſcernment and means of communication with thoſe ſeveral parts of external nature, as are neceſſary to this purpoſe, we find every animal actually poſſeſſed of; and the operation of this commerce, through the agency of the ſenſes, we call by the general name of inſtinct.

As theſe inſtinctive powers are eſſential to, and fully ſufficient for, the preſervation of animal life, in the brute creation, ſo we find them exiſting, in full force, in the higher ſcale of rational beings. Without engaging, therefore, in metaphyſical diſquiſitions, as to the proper offices of the *animus*, and *anima*, in the œconomy of life, we ſhall truſt to the more certain deductions from analogy, and conclude, that though man has, moreover, the ſuperadded privilege of religion or cogitation,

tion, yet, as we have obſerved that the powers and principles of the inferior are always involved and poſſeſſed by the ſeveral ſucceſſive orders of ſuperior exiſtence; and, as we know that the purpoſes of mere animal life are fully and effectually provided for in brutes, by inſtinct without reaſon, ſo the human ſubject alſo poſſeſſes, is indebted to, and principally preſerved by, its notices and protection.

ACCORDINGLY, it is very happily ordered by Providence, that in the human ſpecies, the inſtinctive notices to any action are always proportioned to the importance of it; and for this reaſon, ſuch particularly as are neceſſary to our very exiſtence, are enforced upon us, not only by ſtrong incentives, but generally by proportional immediate rewards in the actual performances of them.

THIS is no leſs true in the preſervation of our being, than it is in the production of our ſpecies: to this we are propelled by motives almoſt irreſiſtible, and to that by the hidden enchantments of hunger and thirſt; and in both alike are bribed to a diſcharge of them by a pleaſure in the execution; without which incentives there is the greateſt reaſon to ſuppoſe a period would ſoon be put to our exiſtence. For if mankind, by ſubſtituting cogitation for inſtinct, were to take in food from principles of reaſon and philoſophy only, and with no other motive but that of ſupplying the waſte expended for the purpoſes of life, great part of them, probably, from inattention or indolence, would ſtarve to ſave themſelves the trouble of eating. Providence, therefore, has not truſted thoſe important concerns either to capricious motives, or the fallible direction of our reaſon.

Besides, philoſophy, or the moſt profound inveſtigations, could never diſcover to us when, or in what quantity, thoſe ſupplies were neceſſary, or whereof they ought to conſiſt: theſe myſterious notices muſt depend upon a more comprehenſive knowledge than we are poſſeſſed of.

And accordingly, Providence has imparted to us the reſults of its own wiſdom in the inſtinctive informations of *hunger* and *thirſt*; and, conſequently, upon thoſe notices we do in fact depend for the ſupport of life; for, it is very certain, that in a ſound and unvitiated ſtate of nature, when we are inſtinctively incited to eat, the body then needs a ſupply; that when the craving ceaſes, the quantity taken in is ſufficient; and alſo that the digeſtive powers of the ſtomach are ordinarily proportioned to the quantity which has been conveyed into it.

So far, therefore, as to the mere *quantity* of food; the *time* when, and how often a freſh ſupply of it becomes neceſſary to the recruit of the worn and waſted fibres, or for the other purpoſes of animal life, the ſimple inſtinct of hunger may, indeed *muſt*, be depended upon as ſufficiently informing us.

But, of what kind or nature the materials ought to be, or what peculiar properties they ſhould poſſeſs, to qualify them for imparting to the blood ſuch principles as are adapted to a coaleſcence with, and to the ſupport of, a machine ſo infinitely complicated and various, and without which qualities they could not be proper for the purpoſes of recruiting the decay of the ſeveral parts of the body, the deepeſt reſearches of the human mind never could diſcover to us. We are intirely at a loſs, in a way of reaſon, not only to make choice, out of the infinity of ſubſtances before us, of thoſe things which contain ſuch properties as are calculated for the ſupply of the wants and purpoſes of nature; but the human mind is ſo totally blind to diſtinctions of this ſort, that it is not capable even of making a proper diſcrimination of them, from thoſe ſubſtances that would be pernicious, or even to diſcern food from poiſon.

THIS intelligence, or neceſſary power of diſcernment, the Author of our being has likewiſe endowed us with, by the perceptions of the *eye*, the ſenſe of the *ſmell*, and the ſcrutiny of the *palate:* and theſe ſublimated modifications of *feeling*, nicely adapted to the internal ſtate of the body, eſtabliſh the commerce, and become the connecting media, between the animal and external nature. Whenever therefore the appetite gives the neceſſary notice for a ſupply, the firſt teſt the ſubſtance we propoſe for food undergoes, is that of the eye; and if it incurs its diſapprobation by looking diſagreeably, even this in general becomes a reaſon for diſcarding it. But if, on the contrary, its appearance is pleaſing, and ſatisfies the ſenſe of ſeeing, it is ſubmitted to the ſucceeding teſt of the ſmell, which often diſcovers a latent miſchief concealed from the former; and then its information is generally, and no doubt with great reaſon, attended to. But if it eſcapes this ſcrutiny alſo, we offer it to the further examination of the taſte; and if that gives a ſanction to our choice, the materials are then conveyed into the ſtomach and guts; both which, however, as a further guard againſt miſchief, are evidently endowed with a perception of their own; inſomuch, that if what was made uſe uſe of for, and conveyed into the ſtomach as food, does, notwithſtanding all the former teſts, ſtill poſſeſs a lurking property, which would be injurious to the conſtitution, the ſtomach is ſtimulated into a rejection of it by the act of vomiting, or the guts by that of a diarrhœa.

These internal perceptions and conſequent exertions, therefore, are truly the firſt and ſimpleſt acts of what is called Nature; ſo that diſeaſe is ſeen here in its ſimple and leaſt complicated form.

BUT if, notwithſtanding all thoſe out-guards to the body, there ſhould ſtill be a ſubtile concealed principle remaining, which paſſing into the conſtitution, would be offenſive to the fountains of life, even then animal exiſtence is not left in a defenceleſs ſtate; for when the blood is contaminated with ſomething to which, in a ſound ſtate, the retaining veſſels were not originally accuſtomed, the heart, and the various vaſcular parts of the body ſubject to the influence of the evil, (in analogy to the palate, ſtomach and guts, and from the ſame principle of animation) will, by a perception acquired under a natural quieſcent habitude to good blood, be ſtimulated into preternatural exertions not unlike the vomitings of the ſtomach, and which, in the form of a fever, frequently forces or purges off the offending matter through ſome of the excretory ducts. For this reaſon, in the inſtance of inebriation or debauch, before the conſtitution is accuſtomed or habituated to it, every irregularity of that ſort is attended with a temporary fever, which, after a reſtleſs night, is ordinarily terminated by a critical ſweat in the morning.

THIS reſiſtance and effort, however, againſt evil, ſo far as the principle of habitude is concerned in that reſiſtance, will ſucceſſively leſſen in proportion to the repetition of theſe violences offered to the conſtitution; for that very habitude, which was in a great meaſure at firſt the cauſe of the quiet and tranquillity, or of that eaſe and want of all feeling which conſtitute health, and which the ſeveral vaſcular parts of the body enjoyed in a ſound and perfect ſtate of the juices, will at laſt ſubvert the intentions of nature, by reconciling them to thoſe fluids when in a diſeaſed condition.

So long, therefore, as the diſcerning faculty of the palate continues pure and unvitiated, and the perceptive powers of the ſtomach, guts, and more remote receſſes of the vaſcular ſyſtem, are quick and active; ſo long the conſtitution will preſerve itſelf from external contamination by their notices, or, what is the ſame, by occaſional efforts and exertions of their ſeveral powers, or, by what are called ſo many neceſſary morbid proceſſes. But when, from a long courſe of perpetual intemperance, the order of things is unhappily inverted, and all thoſe principles of ſecurity and defence do, by a habitude to evil, become inſenſible and reconciled to it, the debauchee will perhaps exult in the perſuaſion that his conſtitution is at laſt become ſuperior to all the burthens he lays upon it, becauſe debauch ceaſes to produce diſeaſe. But it is in fact a deadly inactivity; the diſcerning powers of animal good and evil are loſt; and from this time a bad habit commencing, a ſcratch may prove mortal, from the deſtruction of the renovating powers of the conſtitution. In ſhort, the blood becomes poiſoned, and of courſe all the juices of the body which are ſecreted from it.

To return. How it comes to paſs that theſe out-guards of the body, viz. the eye, the noſe, and the palate, ſhould have this intelligence with the internal ſtate of the conſtitution; or by what inviſible ligaments the connexion is produced, ſo that whatever is pleaſing and agreeable to the former ſhould be perfectly adapted to the latter, is perhaps to us inexplicable; but we may be aſſured that they are ordinarily ſuited to each other, inſomuch, that whatever excites pleaſure in theſe ſenſes, as long as they remain in a perfect and undepraved ſtate, is proper alſo for the purpoſes of the animal œconomy. Indeed this great principle of ſecurity and preſervation, ſo eſſentially neceſſary to the animal, is at the ſame time ſo perfect and active, that the ſight and ſmell are ſtimulated by the miſchief into a perception, or as it were a feeling of it, before it even enters the body; and not unfrequently the ſtomach alſo uniting with the ſenſes, by a ſympathetic abhorrence of the evil, diſcovers its diſguſt by vomiting, even before it is invaded by it.

INSTANCES of this ſort are not unfrequently ſeen in the effects produced not only by the ſmell and taſte, but even by the eye. Every cathartic is undoubtedly, as far as it goes, a poiſon, and muſt be ſuppoſed, in a ſound and perfect ſtate of the conſtitution, to be pernicious. But when an animal is diſeaſed, it is ſometimes neceſſary to attempt the deſtruction of a greater evil by the operation of a leſs. However, when the bowels have actually experienced the pernicious and poiſonous tendency of the medicine adminiſtered for this purpoſe, the ſenſes will ſo far enter into the confederacy againſt its future attacks, that, in ſome tender and very delicate ſubjects, it will ſubſequently purge through the medium of the eye: and accordingly there have been inſtances where a doſe of phyſic on the chimney-piece has operated as effectually upon the body, by this ſpecies of intelligence, as if it had been actually lodged in the bowels.

These out-guards of the body are indeed ſo exquiſitely adapted to the great purpoſe of animal exiſtence, that there is ſcarcely an inſtance in nature, where a vegetable poiſon does not, either by an ill look, ſtinking ſmell, or bad taſte, give ſufficient notice, by ſome or other of the ſenſes, of its miſchievous tendency. This, indeed, is not always the caſe with chemical ones; theſe being the production of art, nature has not ſo effectually guarded againſt them.

The real correſpondence ſubſiſting between the ſenſes and the internal ſtate of the animal œconomy is proved likewiſe by the different manner in which thoſe ſenſes are affected in different perſons; and, alſo, in the ſame perſon, in different circumſtances of the conſtitution.

Some general ſubſtances indeed there are, which the ſenſes of all mankind agree in approving, and theſe are accordingly pronounced, by experience, to be proper materials for recruiting the body; and, becauſe they are generally agreeable, may be therefore proper for the ſame perſon in every ſtate of the conſtitution; but there are other productions, which, though very pleaſing to the palate of ſome, and therefore very proper for the correſponding conſtitution, are nevertheleſs very diſagreeable and nauſeous, and for that reaſon detrimental to others. This is true to ſuch a degree, that when any particular food, which, though exceedingly pleaſing to one perſon, has been, by cheating the teſt of the palate, imprudently, and without his knowledge, conveyed into the ſtomach of another, to whom it was diſguſtful, the ſtomach has either diſcovered the impoſition, and rejected it, or it has ſometimes been attended with worſe conſequences; and, according to the old adage, one man's meat has proved another's poiſon.

THIS is not only true in different ſubjects, but alſo in the ſame perſon in different circumſtances. We not only admire in youth what is leſs agreeable in more advanced age, but in the intermediate part of our lives, we at different times like and diſlike the ſame things; and their effects upon the ſtomach and conſtitution ordinarily keep pace with thoſe notices. The correſpondence of the palate, &c. to the various alterations which happen in the ſame conſtitution, is in no inſtance ſhewn more ſtrongly than in inſtinctive pointings, when the alterations in the body are ſo great as to become a diſeaſe. This principle leads the dog to his medicine, graſs, and the ſeveral ſpecies of animals to their various noſtra; and in the human race, is frequently ſeen alſo by thoſe eager longings for particular things which, in other circumſtances, were not agreeable; and the ſalutary effects of an indulgence in them, have been ſeen in a thouſand inſtances. For though every whimſical or capricious inclination of a ſick patient is not to be attended to, yet, when the deſire of any particular food is violent and laſting, it may be depended upon that ſo ſtrong a pointing of nature generally has its foundation in truth.

FROM theſe conſiderations, therefore, we may conclude, that as without thoſe inſtinctive informations of the appetite and ſenſes, we ſhould not know, even at all, when to eat, how much to eat, or what to eat; ſo we may be very ſure that the varieties we find in them, in different perſons, are in the general nicely adapted to the peculiarities in the conſtitution of each individual.

THE impropriety, therefore, of preſſing a regimen upon another, though diſagreeable to him, becauſe it ſuits our own palate, ſtomach, and conſtitution, is very apparent; for though there are ſome things, as was before obſerved, in the approbation of which all agree, and which are therefore ſet down in the liſt of thoſe which are eaſy of digeſtion, there are however others, and of this ſome of the ſhell-fiſh tribe afford a remarkable inſtance, which, though grateful to the ſtomach and agreeable to the conſtitution of ſome, will be yet evidently poiſonous to others. For this reaſon, therefore, to impoſe obſtinately our own feelings and experience in direct oppoſition to the experience and feelings of another, is very abſurd.

Exact, however, as thoſe external indications are, and in general equal to the purpoſe of ſecuring the body from any thing that would be pernicious to it, it muſt, notwithſtanding, be acknowledged that, in common with every other part of the animal, they are not, as hinted before, ſo very perfect, but that they are ſometimes ſubject to deception, and the detection of that imperfection is commonly diſcovered by the perception of the ſtomach, and is frequently experienced under the well-known diſorder of a ſurfeit.

Hitherto we have conſidered thoſe external perceptive faculties as teſts of examination only, and that as we have in fact no other means of information with reſpect to the great profuſion of materials before us, which of them are proper for the purpoſe of animal preſervation; ſo they are nicely adapted to the conſtitution of each individual, and likewiſe to the differences of conſtitution which may happen in the ſame body.

This, though an important uſe of the ſenſes under conſideration, is, however, by no means the only benefit the animal receives from them in the great buſineſs of nutrition; for we are not only informed by their notices of thoſe materials which are proper for repairing the decays of the body, but are alſo ſtimulated into the choice of them by the pleaſure which thoſe ſenſes afford us in the uſe of them; inſomuch that the indiſpenſible ſupply, which without this gratification would be a diſagreeable and laborious taſk, is by their means rendered pleaſing, and not the leaſt of our enjoyments.

But as in the moral world it is a groſs miſtake to ſuppoſe that the whole reward of a virtuous action conſiſts in the conſcious pleaſure ariſing from the performance of it, ſo we muſt remember that the whole uſe of a hearty meal does not reſide in the pleaſure we receive in eating it. They are both alike neceſſary and uſeful pleaſures, by which we are, as it were, bribed to a duty, the great end of which is, in one inſtance, neceſſary to the order and happineſs of the moral world, ſince the action it produces is conſtantly operating in it; and in the other, to the very being of the animal, becauſe the food it takes being enobled by animation, repairs its defects, and preſerves its life.

This pleaſure or gratification, however, which was given us for perpetuating our being, is unhappily but too frequently the cauſe of its diſeaſe, and ſometimes indeed of its deſtruction; and this becauſe we do not properly diſtinguiſh, or carefully attend to, the difference between the enjoyments of palate, and the pure and ſimple cravings of hunger. It muſt be remembered, that the petulant and clamorous demands of hunger and thirſt are the firſt, and indeed only, incitements to a neceſſary ſupply for the purpoſes of life; and alſo, that with this important intelligence the external ſenſes have no manner of concern; therefore, as we can receive no information but from thoſe appetites when a ſupply is wanted at all, ſo we have remarked that the degrees of them are proportioned to the wants of the conſtitution; for when there is a great conſumption of ſtrength or fleſh, by hard labour or violent exerciſe, the income muſt of courſe be proportioned to the expence. So long therefore as we act ſimply under the motive of hunger, we ſhall not err as to the frequency of the ſupply, or the neceſſary quantity of it. But if, on the contrary, we miſtake the means for the end, and become enſlaved to the palate by cultivating the delights of it; in ſhort, if inſtead of enjoying the pleaſures of this motive to our duty within the bounds intended by nature, we unhappily ſubject ourſelves to the dominion of it, and ſo far as intirely to loſe ſight of its original intention, we ſhall in this inſtance, as well as in many others, convert a bleſſing into a curſe; ſince that neceſſary incitement, which was deſigned by nature for the ſupport of life, will, by ſowing the ſeeds of death, become its deſtruction.

We muſt remember, therefore, that the power of the conſtitution to convert food into nouriſhment depends upon and keeps pace with the ſimple informations of hunger only; or, in other words, that the digeſtion is in general proportioned to the appetite; inſomuch, that where there is a total want of hunger, there is alſo ordinarily an intire ſuſpenſion of the digeſtive powers. This truth is exemplified in its utmoſt extent when an animal is out of order, and the conſtitution ſo much injured, that a diſeaſe becomes neceſſary to its repair; for here nature always commences the proceſs by totally deſtroying the appetite, that no further confuſion or miſchief may be added to the already oppreſſed œconomy. Accordingly, if, in thoſe circumſtances of the conſtitution, the patient is prevailed upon to eat, not only perhaps without appetite, but even in ſpight of nauſea, the ſtomach generally ſecures the conſtitution from the intruding miſchief by rejecting what has been forced into it. As ſoon, however, as by the diſeaſed proceſs the evil is ſwept from the habit, and the digeſtive powers of the ſtomach, in common with the general œconomy of nature, are reinſtated, the firſt notices of it are always ſhewn by the tender calls of appetite, which ſoon increaſing beyond the uſual ſtandard, repairs the waſte and expence occaſioned by the diſorder.

If therefore we take in food from motives of pretended reaſon, without the notices of hunger; or, which is the ſame, are tempted to continue to do ſo by the incitements of the palate, after that hunger ceaſes; ſuch an indigeſtion, by exceeding the expence and real demands of nature, will become a ſource of diſeaſe, and we ſhall certainly convey more into the ſtomach than can be converted to the purpoſes of life; and the neceſſary conſequence attending an habitual practice of this ſort will be, that if the principles of life are vigorous and active, they will, by the accumulated miſchief, be ſometimes ſtimulated into violent occaſional efforts, or, which is the ſame thing, into an acute diſeaſe, to diſcharge the evil from the conſtitution; or otherwiſe,

wiſe, if the powers of animal preſervation are languid through original weakneſs, or, from habitude to it, have loſt their perceptions of evil; chronic miſchief will follow, as well as a hoſt of anomalous hypochondriac complaints, which are truly no other than the language of an oppreſſed conſtitution.

Indeed, if one takes a view but for a moment of the form and make of the human body, one cannot but perceive that the locomotive powers of which it is poſſeſſed, and which were certainly made for employment, make up a great part of the machine. How large a proportion, for inſtance, does the apparatus for the motion of the lower limbs, the legs and thighs, bear to the other parts of the animal! and if to theſe we add alſo the other muſcular powers of the body, which are all calculated for exertion, how ſmall a part of the whole remains! Now, ſince Nature never puts herſelf to uſeleſs expence, if all thoſe agencies are not employed, the organs for their ſupport becoming for that reaſon unneceſſary, gradually decay. From this principle the muſcles in general, through indolence and lazineſs, or the legs in particular of a gouty man, from incapacity for motion, become flaccid, grow weak, and waſte; and, on the contrary, thoſe of the laborious, as the limbs of a porter, grow firm, ſtrong, and large. If ſuch a ſupply, therefore, as would be ſufficient for the ſupport and employment of all thoſe powers, is taken into the conſtitution without being applied to th purpoſes of them, it is impoſſible but the conſequent accumulation muſt be productive of diſeaſe.

And here I cannot help remarking, that I have lived long enough to be convinced, by repeated obſervation, that from the above conſiderations it is that the grand climacteric, or at leaſt its vicinity, becomes a period of that importance to the life of man: for about this age, indolence and indiſpoſition to motion from the natural impotence of increaſing years, generally gain ground, and frequently render eating and drinking the great buſineſs of life. If, therefore, in thoſe circumſtances, a man has not firmneſs enough to withſtand the enjoyments of the palate, or reſolution ſufficient to counteract the effects of them by a degree of exerciſe or labour proportioned to his ſtrength, the pernicious tendency of this indulgence unites itſelf to the baneful conſequences of a lazy inactivity. The body, therefore, inſtead of wearing equably with the gradual approaches of old age, as it uſually would do in a ſtate of temperance, becomes bloated with an accumulating pituitous, indigeſtible traſh, which nature is totally unable to animalize, or convert to the purpoſes of life: the excretory ſyſtem, from this cauſe and want of motion, being neceſſarily choaked, is at laſt totally obſtructed; and then the conſtitution breaking up, the ſolids rot in their juices.

Since therefore a ſound and uncontaminated ſtate of the conſtitution muſt neceſſarily depend upon a ſupply proportioned to thoſe demands of nature which are ordinarily ſignified to us by the inſtinctive notices of hunger and thirſt; if, notwithſtanding, by the temptations of ſenſe, we are determined to exceed this ſalutary meaſure, the ill effects of the conſequent diſeaſed accumulation can no otherwiſe be avoided, than either by phyſically ridding the *primæ viæ* of it before it gets into, and injures the more remote receſſes of life; or we muſt, by increaſed exerciſe or labour, make, if poſſible, that neceſſary, which would otherwiſe be diſproportioned to the expence of the conſtitution.

These conſiderations diſcover to us the true reaſon why diſorders, particularly thoſe of the chronic kind, are much more rare in the brutal than in the human race: for the ordinary productions of nature afford no ſtimulatives to provoke the animal to tranſgreſs the ſalutary bounds of hunger; and therefore their diſeaſes, at the ſame time that they are few and ſimple, are ordinarily provided for by inſtinctive indications to their cure. It is, however, almoſt unneceſſary to remark, that from the above obſervation we muſt exclude thoſe creatures which, unhappily for themſelves, are taken out of the care of nature, and ſubjected to another train of management; for when a horſe, for inſtance, by ſubſtituting reaſon for inſtinct, is taken under the care of man, we are not to wonder if the inferiority of the former to the latter is diſcovered by numberleſs conſequent diſorders to which the animal was not naturally ſubject, and which, as they are the bungling creation of reaſon, muſt depend upon that likewiſe for a cure, ſince nature has made no proviſion for them.

From this view of animal nature, we ſee things are ſo exquiſitely ordered, that it is not eaſy, while the body and its perceptions are undepraved, for an evil to inſinuate itſelf into the conſtitution; or, if it ſhould do ſo, to remain there without producing a train of effects which diſcharge it.

This will be more plainly ſeen by conſidering a diſeaſed proceſs of any kind. Let us ſuppoſe it, for inſtance, of the nephritic ſort, becauſe here the evil is ſo groſs and palpable, that we ſhall be able to follow it through the whole progreſs of its expulſion. If then a ſmall ſtone is formed or lodged in the pelvis of the kidney, there it will remain, if not large, perhaps without pain, or giving much alarm, till by ſome accidental ſhock, or a particular poſition of the body, it drops into the ureter; and then the diſeaſed proceſs, or the cure of nature, which is only another mode of expreſſion for a neceſſary train of conſequences, commences, and will ſucceed in the following order. The ſenſible coat of the ureter will be firſt ſtimulated into pain by the irritation of ſo hard a ſubſtance: this will be ſoon increaſed by the neceſſary ſtretch of the ſuperior part of the tube, occaſioned, when the ſtone is large, by the obſtruction of the urine. Pain always produces inflammation; the conſtant effects of inflammation are convulſive twitches, which, by the aſſiſtance of the ſtomach, drawn likewiſe by a conſent of parts into the ſame efforts, expel the miſchief into the bladder, where it ordinarily paſſes off with the ſtream of urine. Thus the diſeaſed proceſs being finiſhed, we ſee that the evil, by operating upon perceptive matter, became the cauſe of its own diſcharge.

And here it is to be obſerved, that as the agents concerned in the nephritic cure were the foreign ſubſtance itſelf, and, ſubſequently, the pain produced by it; ſo, in this view, the latter cannot be conſidered ultimately as an evil, becauſe it was eſſentially neceſſary to the expulſion of the ſtone: for though every evil which invades the body has a direct tendency to deſtroy it, and all that train of neceſſary conſequences ariſing from it within, are in themſelves ſo many individual evils, (and ſuch is the pain and inflammation in the diſorder we have now under conſideration) yet, by the infinite wiſdom exerted in the conſtitution of animal nature, it is ſo contrived, that the whole concatenation of evils ſhall always have their tendencies ſo directed towards a right end, as to be ſubſervient to the purpoſes of life, and ultimately deſtroy themſelves by removing the fountain from whence they ſprung.

If therefore an opiate (which, notwithſtanding, is, on ſome accounts, very uſeful in the paroxyſm) did nothing elſe but, by inducing ſtupefaction, render the body inſenſible to the irritation of the miſchief, it would be evidently pernicious; by ſo far cauſing a partial kind of death, which would, as long as it laſted, ſuſpend the ſalutary, though diſtreſſing part of the proceſs; but happily the opiate, at the ſame time that it takes off the ſpaſm of the ureter, relaxes it alſo; ſo that the impending ſtream of urine meets with leſs oppoſition in puſhing forward the ſtone.

So likewiſe in external injuries, if an animal ſprains a limb, the notices of pain in the parts which have been injured diſpoſe him to place them in the ſituation which produces leaſt uneaſineſs, and which is of courſe the very poſition where the injured parts are leaſt upon the ſtretch, and conſequently the beſt for the recovery of their tone. And as, by the accident, a number of lymphatic and other veſſels are ordinarily burſt, the neceſſary leakage from them produces a ſwelling, which becomes the equable bandage of nature, and is exceedingly uſeful in confining the limb in the ſituation in which the animal placed it; and this ſwelling ordinarily continuing till the injured ligaments or tendons have recovered themſelves, the abſorbent veſſels, by taking up the extravaſated fluid, remove it at that period when the tumor becomes unneceſſary.

The ſame train of neceſſary conſequences, ariſing from an evil with which the body is affected, appears alſo from wounds inflicted on the ſurface of it. Thus, for inſtance, when a conſiderable wound is inflicted on a muſcular part, the firſt neceſſary conſequence is, that the divided blood-veſſels bleed freely, till, if the hæmorrhage is not in its nature mortal, the conſequent faintneſs ſo far weakens the power of the heart, that the blood is not propelled with ſtrength enough to force it any longer through the divided veſſels, the mouths of which, by this time, begin to be choaked up by the grumous blood; and thus the hæmorrhage neceſſarily ſtops, or is cured. The next conſequence is, that though the wound may be inflicted by an inſtrument tolerably ſharp, there are, however, ſome of the parts ſo far lacerated, and in part ſeparated from the ſounder, as not to be ſupported in a ſtate of life: theſe, therefore, rotting into a ſtinking ſanies, diſcharge themſelves; and this proceſs continues ſo long as, and no longer than, the parts reduced to this condition are, by means of it, conveyed off. And now the firſt ſtage of digeſtion being over, and the wound of courſe clean, a ſoft balſamic moiſture ouzing through the wound covers the ſurface of it, till the tender granulating fleſh, guarded by this means from the injuries of the air, and riſing under the protection of it, reaches the level of the ſkin, which then ſhooting horizontally forward, puts a ſtop to the diſcharge at the very time it ceaſes to be neceſſary. Thus the injured part is recovered, as far as the renovating principles of nature allow: theſe, indeed, are not abſolutely perfect; for, were they ſo, a wound would not leave its ſcar, and the body would become immortal.

Indeed, the proceſs and œconomy of nature in curing common and ordinary injuries on the ſurface of the body in a healthy ſtate of the animal, is generally ſo ſucceſsfully executed, that it would be perhaps for our intereſt were we to give a little more credit to the ſame principle in wounds of greater importance; for the more we contemplate this renovating power, the higher our veneration for it will certainly riſe, and the more jealous we ſhall grow of the impertinent intruſions of art.

The chirurgical world muſt be very ſenſible how much the curative doctrine of wounds has been, in this reſpect, indebted to the abilities of Mr. Sharp, who, from a knowledge grounded on great experience, and that perſpicuity of reaſoning only attendant on genius, has, not to expreſs it in harſher terms, ſhewn the uſeleſsneſs of the various medicines employed in the old ſyſtematic treatment of ordinary wounds, and ſimplified the whole farrago, where the habit of the patient is good, into little more than dry lint, or a ſoft, eaſy nothing. He has alſo remarked upon the ill effects produced on the tender granulations by the pernicious nicety of wiping off that ſoft and bland defence with which nature always guards the generating fleſh. However, ſince the general tendency of Mr. Sharp's doctrine was almoſt wholly confined to the removing of impediments from the operations of nature; and ſince he clearly ſaw the folly of ſuppoſing, that either bone, fleſh, or ſkin, was the production of the ſurgeon's boaſted apparatus; and that therefore the whole proceſs of healing was the act of the conſtitution; it is, perhaps, to be lamented that he had not purſued his own convictions a little farther, by giving credit to the ſame ſimple treatment in wounds of greater importance, and even in thoſe of a complicated kind.

We know that the method of cure by inoſculation, or what is generally called the firſt intention, if the wound is recent, and unaccompanied by laceration, is now much more practiſed than formerly, and is generally ſucceſsful, provided the parts are retained in contact, in a perfect ſtate of reſt, and defended from the influence of the air. The ſucceſs of this ſpecies of cure depends upon this principle, that the air is the great agent of putrefaction, at leaſt that the common atmoſphere is very active in promoting purulence and its concomitant ſymptoms, or of producing miſchievous effects upon all the internal parts of the body which are not naturally expoſed to its influence; conſequently, when once a recent wound becomes ſubjected for any time to its agency, the firſt ſtage of digeſtion is produced by it, and then the order of cure neceſſarily proceeds in another and more tedious manner. Accordingly nature always guards againſt the effects of it as expeditiouſly and effectually as it can.

If a large wound is inflicted upon a horſe, and ſuffered to proceed without interruption in a way of nature, the blood itſelf that remains upon its ſurface when the thinner parts of it are evaporated, forms a ſufficient varniſh or covering to defend the wound from the injuries of the air; and commonly the parts, without any digeſtion, heal under that defence.

If there happens to be a loſs of ſubſtance, or a part carried off by the blow, and the wound is therefore to be filled up by a generation of new fleſh, the ouzing matter, which afterwards covers its ſurface, forms itſelf alſo into a cruſt; and if, in thoſe circumſtances, the granulations, by growing faſter than the ſhooting ſkin, and then riſing above the level of it, ſhould become an impediment to the cure, even here the evil remedies itſelf; for as there is not a ſufficient proviſion by nature for the ſupport of this unneceſſary generation, the excreſcent maſs dries into, and makes part of the general cruſt; ſo that the ſkin, ſhooting under it, the whole covering drops off, and juſt at the time too that the wound is completely healed. In this manner Nature has a method of regulating the ſeveral parts of her operations, and keeping them within bounds; for as every fungus, unaccompanied with caries, or any other unnatural ſtate of the wound, is good fleſh, and whenever it riſes above the level of the ſkin, offends only by its luxuriance, it never riſes but to a certain height, where not being ſufficiently ſupported by an order of organized veſſels, it always, if it is not kept moiſt by covering, grows into a ſcab, and drops off to the general level of the ſkin.

That the air is, in fact, a great agent of putrefaction in recent wounds of every ſort, numberleſs inſtances ſufficiently inform us. After an abſceſs is opened, and the matter diſcharged, the ſurgeon may immediately introduce his finger into the wound, and examine the ſides of it, without giving his patient any conſiderable uneaſineſs; but the introduction of the air at the ſame time, by acting upon the ſurface of the wound, and diſpoſing the parts to inflammation, will render ſuch an attempt, the ſucceeding day, intolerably painful.

The appearances attending very conſiderable contuſions, thoſe particularly which frequently happen in the foreheads of children, ſufficiently inform us, by the colour, ſize, and feel of the ſudden tumor, that there is underneath the ſkin a very large extravaſation of blood and other juices from the leakage of the lacerated veſſels: however, if the ordinary covering is not broke, we ſee that the abſorptive powers commonly return the extravaſated fluid, and the injury the parts received is expeditiouſly repaired, without any ſucceeding inconvenience. But if the ſurgeon, by not giving a ſufficient degree of credit to the powers of nature, inadvertently makes an opening in the ſkin to diſcharge the extravaſated fluid, the introduction of the air converts the tumor into an ill-conditioned hollow wound, often as extenſive as the injury, which, after diſcharging for ſome time a gleety ſanies, is not perhaps healed at laſt without dilatation, and almoſt always with a loſs of that ſubſtance which formed part of the digeſtion, as is afterwards diſcovered by the depreſſed ſurface of the ſkin when the wound is healed.

The remarkable difference alſo between the effects of the cauſtic and knife in the radical cure of the hydrocele, in all probability ariſes from little elſe than the influence of the agency under conſideration.

From frequent and familiar inſtances, to the above purpoſe, I have long been confirmed in an opinion, that the great difference between compound and ſimple fractures in a great meaſure depends upon the above circumſtance. That theſe accidents are in fact attended with conſequences as different as can be conceived, conſtant experience convinces us; for as ſimple fractures, though the cauſes of them may have been attended with circumſtances of the greateſt violence to the injured parts, are yet ſcarcely ever productive of danger; ſo compound ones, in the ordinary management, are ſo truly formidable, ſometimes from the loſs of life attending the mortification of the limbs, always from a confinement of many months, and not unfrequently, at laſt, a miſ-ſhapen, cumberous leg, ſcarcely as good as a wooden one; from theſe conſiderations, it is by no means clear that it would not be for the intereſt of the patient that, ordinarily, the limb ſhould be amputated immediately on the accident, before nature is ſtimulated by it into the additional danger of a ſymptomatic fever.

We frequently meet with ſimple fractures of the leg, where both the bones have been broken with the greateſt circumſtances of violence; where they have been ſplintered; where they have been nearly puſhed through the ſkin; and where, by the appearance of the ecchymoſis, or leakage from the torn veſſels, the violence and laceration the parts have undergone are, ſometimes demonſtrably, as great as they can, and frequently more than they actually do, receive, in a compound fracture. But notwithſtanding all this, if the limb is not injured by motion or bandage, but left as nearly as poſſible to the treatment of nature, it is followed by none of thoſe formidable circumſtances which ſo ſtrongly mark the character of the compound fracture, but uſually by the inconvenience only of about ſix weeks confinement.

On the contrary, if the bone happens but to puſh through the ſkin, or the ſurgeon, from an apprehenſion that the extravaſation is too conſiderable for the abſorbent veſſels to return it into the habit, injudiciouſly makes an inciſion into the tumor, and by that means opens a communication with the external air; this expoſure to its putrefying agency preſently converts the ſimple fracture into the nature of a compound one, which is frequently attended with all that train of miſchiefs ſo generally attendant on wounds of this ſort.

It is demonſtrable, therefore, that the great difference, in thoſe two ſpecies of fractures, muſt ariſe either from the miſchiefs the lacerated parts of the compound one receive from the action of the air upon them, or from the different quiet and reſt the injured parts enjoy under the different management of thoſe fractures, or from both cauſes united.

In ſimple fractures, after the limb is, by proper management, placed in a good poſition, the irritation from pain being always conſidered as miſchievous, is, as much as poſſible, avoided, and the whole proceſs is ſubſequently left to nature in an undiſturbed ſtate of reſt.

But in the compound fracture, beſides a very long expoſure to the miſchievous agency of the air during the firſt examination, and frequently rough chirurgical treatment of imbridling the parts of the wound, as well as the irritating proceſs of removing ſplinters, &c. &c. after the firſt riſque of mortification from all this is over, the freſh and daily irritation the wound receives from the ordinary dreſſings is increaſed occaſionally alſo by ſacrificing the eaſe and ſafety of the patient to a pernicious nicety, viz. that of keeping all clean, by every now and then moving the limb. This muſt be neceſſarily attended with very ill effects; for though under the beſt aſſiſtance, and with the greateſt caution, the limb be moved ever ſo gently, yet the fears of the patient will never permit him coolly and reſolutely to repoſe that implicit confidence in thoſe who raiſe and ſupport his leg, as to leave it paſſively and intirely to them; but he will (and in fact we ſee he does, by the tremulous and ſpaſmodic efforts of the very parts which have been torn) endeavour, in ſome meaſure, to do it himſelf: and if to this conſideration be added the unavoidable motion the parts muſt actually receive from the aſſiſtants themſelves, it will be found impoſſible to prevent the painful irritation excited in the ſurrounding inflamed and injured parts by the ragged ends of the broken bones. And how far the agency of this painful aggravation is capable of producing that large flux of matter, and thoſe ſucceſſive abſceſſes, ſo frequently met with in the ordinary treatment of thoſe formidable wounds, need not be explained.

SINCE then by an artificial, injudicious opening, and a conſequent imprudent management, it is poſſible to convert a ſimple fracture into, and artificially to create all the miſchiefs of, a compound one, it ſhould ſeem more than poſſible that, by inverting the treatment, and truſting more to nature, a compound fracture might, in ſome meaſure, be reduced to the ſtate of a ſimple one.

ON this principle I have not only practiſed with ſucceſs myſelf, but have ſeen inſtances where it has been adopted with equal advantage by Mr. Yonge, a very ingenious ſurgeon of this town; and though I am ſufficiently furniſhed with them, yet, as I ſhould reluctantly enlarge this digreſſion by a recital of caſes, to demonſtrate the practical truth of this doctrine, I will, however, take the liberty of relating one only, as a ſample, which was communicated to me by Mr. Forteſcue, a ſurgeon of this town, whoſe brother was the ſubject of the accident, and of this peculiar and ſucceſsful ſpecies of treatment.

On the 4th of July, 1770, at Launceſton, about twenty-four miles from this town, the patient's horſe having taken fright, ran away with him, and carried him with violence againſt the wall of a bridge, which broke his leg. Mr. Rowe, a ſurgeon of the town, was immediately called to his aſſiſtance; who, on examining the limb, found a compound fracture of the moſt formidable kind. The wound, which the protruding tibia had torn, was full four inches long, and ſo large, that he paſſed three of his fingers almoſt round the body of the wound; and the hæmorrhage from it had been, and then was, very conſiderable. There were alſo ſeveral other ſmaller wounds formed by ſplinters of the bone; the largeſt of which, a very conſiderable portion of the end of the tibia, being pretty looſe, he endeavoured to extract; but finding more force neceſſary for that purpoſe than was thought prudent to be exerted, the ſurgeon deſiſted from any further attempt. In theſe alarming circumſtances, therefore, having placed the limb in a fracture-box, in the beſt poſition it was capable of, and having alſo haſtily applied to the wound a doſſil of lint dipped in the traumatic balſam, and over that a pledgit ſpread with the Ung. e Gum. Elemi. ſecured with the many-tailed bandage, Mr. Rowe immediately diſpatched a meſſenger hither with a letter to his brother, ſignifying, that as he was thoroughly perſuaded an amputation was adviſeable, and as expeditiouſly too as poſſible, he wiſhed Mr. Forteſcue's immediate attendance, as his patient would not ſubmit to the operation but in his brother's preſence, and with his approbation. Mr. Forteſcue knowing that Mr. Yonge, with whom he had ſerved his time, had lately, with great ſucceſs, treated compound fractures in a way very different from the ordinary mode of practice, requeſted him to accompany him.

On their arrival, they were agreeably ſurpriſed to find the patient in perfect eaſe, and without a ſymptomatic fever, owing partly, perhaps, to the large preceding hæmorrhage, and which alſo rendered any future bleeding unneceſſary. On removing the many-tailed bandage, and ſome of the more ſuperficial dreſſings, it appeared that thoſe underneath had formed one general, hard, and impervious cruſt, which ſtrongly adhered to the ſubjacent parts of the wound. The limb was obſerved to be without tenſion, and its general poſition unexceptionable. Under thoſe favourable circumſtances, Mr. Yonge had the reſolution to expoſe his judgement to the hazard of cenſure, by ſtrongly recommending, not only to ſuffer thoſe dreſſings which were immediately in contact with the wound to remain untouched, but, more effectually to guard againſt the injuries of the air, he adviſed the whole to be covered with ſome more lint dipped in the traumatic balſam, and then to truſt the iſſue to nature, or at leaſt to regulate the future treatment by the eaſe of the patient, or the ſymptoms which might ariſe. Accordingly the limb remained totally untouched, and in an undiſturbed ſtate of reſt, though the weather was exceſſively hot during the whole time, till the ſeventeenth day from the accident. At this time, ſome appearance of pus through the bandage diſpoſed Mr. Forteſcue to remove the dreſſings; when the ſeveral ſmaller wounds, which had been made by the ſplinters of the bone, were found intirely cicatrized, and the large one formed by the protruſion of the bone was firmly incarned, though there was more than a ſpoonful of well-concocted matter upon it. The wound was then dreſſed with dry lint, with a pledgit of Ung. e Gum. Elemi. laid over it; and this dreſſing remained untouched eight days longer, viz. till the twenty-fifth, when, on its removal, the wound appeared ſenſibly contracted, a tendency to a ſpeedy and firm cicatrization very manifeſt; and Mr. Forteſcue thought the re-union of the bones, if not quite complete, very conſiderably advanced. Things being thus circumſtanced, the leg was taken out of the fracture-box, and Mr. Sharp's ſplints being applied to it, the limb, from a ſtrait poſition, was relaxed into an eaſy flexure, to the great comfort and eaſe of the patient. From this time he was daily taken out of the bed till the thirty-third day, when he was removed, in a poſt-chaiſe, from Launceſton to his own houſe, which, tho' a journey of twenty miles, was performed without uneaſineſs or fatigue. The cure now advanced in a very kindly way, and without any thing particular intervening, except that Mr. Forteſcue extracted a ſmall piece of ragged ſtone (which appeared to have been ſplintered off from the wall of the bridge) a few days before the wound ſhut up. Soon after this, the limb became ſtrong, and in every reſpect as ſerviceable as the other.

ANY comment upon this cure would be unneceſſary. I would only beg leave to addreſs myſelf to the candour of the chirurgical reader, and aſk, Whether he ever remembers to have ſeen a compound fracture, as formidably circumſtanced as the above, reduced to ſuch a ſtate by the old ſcientific mode of management, as to enable the patient, with perfect eaſe and ſafety, to ſuffer a removal of twenty miles in leſs than five weeks after the accident. The truth is, at this period the patient's fracture was, by this mode of treatment, reduced to the ſtate it would have been in had it been originally a ſimple one, excepting only a ſuperficial wound of no ſort of conſequence.

Mr. Forteſcue informs me that, ſince the above caſe, he hath had many compound fractures of both extremities, in different ages and conſtitutions; and one compound diſlocation of the ankle, where the end of the fibula protruded above an inch beyond the ſkin: in all which the ſame treatment was uniformly attended with the ſame ſucceſs; and in every inſtance he thought the callous formed as expeditiouſly as in ſimple fractures.

Strange as it may ſeem that ſo important a diſcovery ſhould ſo long remain confined within ſuch narrow limits, I have, however, been authentically informed by the late Mr. Woolcott, a ſurgeon of great experience at Fowey in Cornwall, that he had practiſed from this principle with uninterrupted ſucceſs upwards of thirty years; for, poſſeſſed of much originality, great ſtrength of underſtanding, and a genius truly Hippocratic, his ſagacity enabled him to avail himſelf of any truth that ſprung from his own practice, or that fell in his way, though out of the ordinary and regular channel. However, what firſt led him to this mode of treatment, was a hint received from an old French ſurgeon who had long attended the army in Flanders. He informed Mr. Woolcott that he conſtantly obſerved, in the great number of caſes of this ſort which had fallen in his way, that he loſt many of the better ſort of patients, whom he attended and treated with all the attention of chirurgical addreſs, whilſt the common ſoldiers, in a ſtate of, ſometimes, unavoidable neglect, almoſt always recovered; in ſhort, that ſcarcely any of his patients under compound fractures died, but thoſe of whom he took a great deal of care. Mr. Woolcott availed himſelf of the hint, and adopted the practice of dreſſing the wound as expeditiouſly as poſſible with the traumatic balſam; and after ſecuring his applications with a proper bandage, he placed the limb in the beſt poſition it was capable of; and every morning, for the four or five ſucceeding days, it was his cuſtom to pour the ſame balſam on the bandage, to exclude the air more effectually. Having thus artificially reduced the accident as near as poſſible to the ſtate of a ſimple fracture, he never removed the dreſſings in leſs than three weeks or a month after, unleſs, which very rarely happened,

pened, great pain and an increaſing fever gave riſe to ſtrong ſuſpicions of an approaching miſchief from confined matter; and, during the ſubſequent time of the cure, he ſeldom opened the leg oftener than every four or five days, and never, even then, if it could be poſſibly avoided; or paid ſo much attention to cleanlineſs, as to irritate the parts by moving the limb. He always remarked, when the leg was opened, that if the wound happened not to be incarned, the bones, though covered by matter, appeared perfectly white; and obſerved no inconvenience ever aroſe from this practice, but an excoriation of the circumjacent ſkin from the lodgement of the matter upon it.

Upon the whole, the good effects of this method, in all the inſtances I have ſeen and heard of, have been conſtant and amazingly great; and as they have been certainly owing to a voluntary ſacrifice of the whole parade of art, or chirurgical treatment, to the ſimple and undiſturbed operations of nature, ſo I believe it to be the true reaſon why this practice has not long ſince become more extenſive. I would not be underſtood to mean, however, that it can be proper, or even poſſible, to adopt this method in its utmoſt extent in all caſes without exception or limitation; for if, for inſtance, the fractured ends of the bones ſhould be ſo far puſhed through the wound, or ſo circumſtanced that they cannot be replaced in a tolerable poſition, they muſt certainly be ſawed off; or, where the comminution is great, and the ſplintered parts of the bones are looſe, and almoſt detached, they, without doubt, ſhould be removed; but all this, and whatever elſe the circumſtances of the fracture may render abſolutely neceſſary to be done, ſhould be performed with as little violence, and as much expedition as poſſible; after which it will be certainly found that the leſs is done ſo much the better.

I AM willing to hope this long digreſſion will be ſufficiently apologized for by the importance of it; and now haſten to a concluſion of the general ſubject.

It has been obſerved that the operations of nature, in injuries inflicted on the ſurface of the body, as well as in the more ſimple and uncomplicated diſorders of a vomiting and diarrhœa, ariſing from any thing pernicious in the ſtomach and inteſtines, are, from the wiſdom exerted in the formation of the animal, the neceſſary reſult of the agency of that very evil which had a direct tendency to produce its deſtruction. And, from a well-grounded analogy alſo, it is very certain that the internal operations of nature, or that reſiſtance to evil which conſtitutes acute diſeaſes, (though all the various parts of each proceſs, by being carried on in the ſecret and remote receſſes of life, and not cognizable by our ſenſes, are therefore not capable of ſpecification)

tion) are undoubtedly alſo no leſs a train of neceſſary conſequences reſulting from the operations of ſomething pernicious on the different internal perceptive organs of the body; inſomuch, that as every falſhood in the moral world involves within it its own contradiction; and every degree of turpitude, though it has a direct tendency to ſubvert all happineſs and good order, is nevertheleſs, by the wiſeſt œconomy, defeated of its purpoſe, ſo far as eventually to deſtroy itſelf; ſo alſo every animal evil, after it has even inſinuated itſelf into the conſtitution, carries with it thoſe principles which, operating upon the powers of perception, are the cauſes of its own expulſion.

In this view, then, in which nature, or that effort in the conſtitution of an animal to reſiſt evil, and relieve itſelf from the effects of it, is here conſidered, its operations under the form of diſeaſe appear to be the aggregate of conſequences neceſſarily reſulting from that reſiſtance which the various powers of the animal body make againſt it, and the effects they will be neceſſarily ſtimulated into by the very miſchief itſelf. For as when the offending matter is foreign to that part of the body which may happen to be invaded by it, whether it aroſe from without, or originated from a vice or tranſpoſition of the fluids within, the part ſo affected by it will therefore be, as it were, provoked into expulſive efforts; ſo, for the ſame reaſon,

ſon, all the ſeveral parts upon which it is thrown, will ſucceſſively diſown and diſlodge it from themſelves, till it is quite expelled from the habit.

As, therefore, the Author of our being has, by the cautionary diſcernment of the ſenſes, ſecured the conſtitution againſt the internal introduction of any principle that may be miſchievous to it; and, to guard the animal againſt the general approach of external violence, has alſo completely inveſted it with a nervous plexas, ſo perfectly calculated for the purpoſe of defence, that the point of the fineſt needle cannot invade the ſkin without giving the alarm to the whole body; ſo every part of the ſame body, by being poſſeſſed of the ſame power of perception, is furniſhed with a laſt reſource for its own private defence, after the enemy has got a footing in the citadel.

Whether that abſence of all feeling, or the quieſcent ſtate which all the various vaſcular parts of the body enjoy in perfect health, and in poſſeſſion of their own proper and unvitiated fluids, is owing to as many various and ſpecific powers of perception, with which they may be ſuppoſed to have been endowed reſpectively *ab origine*; or whether it is only a reſult of that habitude to their ſeveral contents, which commenced from, and was coeval with, their being, and which therefore operates by the nature of ſimple perception only; to which of thoſe principles it is owing that the ſaculus of the viper is reconciled to its poiſon, the receptacle of the liver to the bile, the bladder to the urine, and the ſeveral parts of the body to the different fluids they contain, is perhaps a queſtion of mere ſpeculative curioſity, with which, therefore, we are not much concerned; it is fully ſufficient that they do poſſeſs thoſe perceptions. But it is true, and a truth of the utmoſt practical conſequence to us, that though the various perceptions which the ſeveral vaſcular parts have of their own proper fluids, may not originally and ſolely be owing to this principle of habitude, habitude is, however, efficacious enough to deſtroy them: and it is not leſs certain alſo, that the tranquillity, or health and well-being of the animal, cannot be preſerved when the ſeveral veſſels are not poſſeſſed of their own proper fluids, either through contamination or change of place; or, which is the ſame in effect, when, through irregularity or debauch, the vital principle of perception in thoſe veſſels is extinguiſhed and loſt.

However conſiderable, and however eſſential to the preſervation or recovery of the animal, this agency of nature is, it is notwithſtanding, as we mentioned before, a fallible principle, and conſequently not always equal, either to the purpoſes of perfectly ſecuring the body from the introduction of evil, or when evil has got a footing in the habit, to that of reſtoring the conſtitution from a diſordered to a perfect ſtate of health.

And accordingly, at ſome times, from a ſluggiſhneſs or inſenſibility produced by that habitude to evil, which is the cauſe of the greateſt part of chronics--- or at others, from the mortal virulence of the invading miſchief, as in the inſtances of putrid and peſtilential diſeaſes---or, laſtly, from an original languor or weakneſs of the powers of life, joined perhaps to the inſidious nature of the invading enemy, which ſeems to be the caſe in nervous fevers; the agency of nature, I ſay, from theſe and other cauſes, is impotent and inefficacious. In thoſe, and many other circumſtances, therefore, it is the proper province of medicine to attempt the removal of the evil, by affording the powers of life a preternatural aſſiſtance, or to diſcharge it by an artificial diſeaſe, (for ſuch in fact are the efforts to this purpoſe of every medicinal proceſs) and to this end its powers are frequently very effectually exerted. Accordingly, in thoſe kinds of fevers which take their riſe from, and are afterwards ſupported and continued by, a vitiated bile, or other miſchiefs in the firſt paſſages, a well-timed doſe of an antimonial ſometimes cuts the diſeaſe ſhort at once, by diſcharging the evil before it paſſes into the habit, and mortally poiſons the juices of the conſtitution; or, at others, happily prevents the continuance of the fever, by a removal of the fuel from whence it took its riſe.

But when the remote receſſes of life are contaminated from any inexplicable cauſe, inſomuch that evacuations of the groſſer kind are of courſe uſeleſs, as in fevers of the nervous tribe, &c. all the medicines which are efficaciouſly employed for their removal are poſſeſſed of active and energetic principles, which entering the inmoſt receſſes of the conſtitution, do, by their ſeveral powers, ſtimulate the ſluggiſh and inactive vaſcular perceptions to more vigorous exertions; and under this idea, the operations of thoſe agencies, adapted to the intention of producing or accelerating a critical termination of the fever, are truly analogous to thoſe of ipecacuanha or jalap on the ſtomach or bowels. Thus, for inſtance, the active powers of cantharides, though only applied to the ſkin in a bliſtering plaiſter, do, by pervading the whole conſtitution, and the remoteſt orders of the vaſcular ſyſtem, (which is evident from their effects upon the coats of the bladder) quicken a languid circulation, and raiſe a ſluggiſh pulſe, by ſtimulating the heart into greater, and frequently more effectual, exertions againſt the evil with which the blood is contaminated. And, as no part of the vaſcular ſyſtem is excepted from their influence, the ſubtle pungent powers of thoſe ſalts become truly and effectually a lymphatic and glandular purge, by a mode of operation ſimilar to that of cathartics, &c. in the firſt paſſages, producing frequently thoſe copious and ſtinking ſweats ſo ſalutary in this diſorder.

To conclude this ſubject: If what has been ſaid is comprized under a ſhort recapitulation, it will amount to this.

First; That there is in animal nature a principle of renovation, which ſupplies the loſs or waſte ſuſtained in the various operations of life.

Secondly; That in order to this end, the information for the neceſſary ſupply is ſignified by the inſtinctive incitements of ſimple hunger and thirſt; and that the proper quantity of that ſupply is alſo determined by their notices.

Thirdly; It was ſhewn, that as this ſupply muſt be collected out of that infinite variety of ſubſtances which are diſperſed throughout external nature; and as from reaſon alone it would be impoſſible to make the proper choice, therefore the relation or mutual fitneſs between the internal parts of the body and thoſe various ſubſtances is diſcovered to us by the ſenſes; and that theſe therefore are the inſtinctive teſts of examination as to the quality of thoſe ſubſtances which are adapted to the purpoſe of recruiting the body; inſomuch, that what is agreeable to them is ordinarily calculated for that end, and for the ſeveral demands of the animal œconomy; and alſo, that the body is at the ſame time ſecured, by their diſcrimination or diſapprobation, from the introduction of evil, or whatever would be miſchievous to the internal ſtate of the conſtitution.

FOURTHLY; It was obſerved alſo, that the pleaſure which the ſenſes afford us in the act of recruiting our ſtrength, &c. was intended as an incitement to, and a reward for, the performance of this neceſſary duty; but it was ſubſequently remarked, however, that thoſe incitements to it, ſometimes, by abuſe and indulgence, defeated their own end; and alſo, that though the ſenſes, when in an undepraved ſtate, are ordinarily ſufficient for the purpoſes of preſervation, yet, that as they are fallible, and ſubject to deception, a principle of evil may ſometimes, without notice, inſinuate itſelf into the body.

Fifthly; It was further ſhewn that, beſides thoſe principles which the animal poſſeſſes for recruiting the waſte of the body, and preſerving it in health, it is furniſhed alſo with certain active powers, which operate towards a recovery of it from a diſeaſed to a ſound ſtate; ſo that when, through the abuſe or fallibility of the ſenſes, any miſchief gets an internal footing, a diſeaſed proceſs, or an effort towards recovery by an expulſion of the evil, commences; and that the firſt and moſt ſimple diſeaſe is produced by an effort made in the ſtomach, which, from a perception of its own analogous to that of the palate, is ſtimulated by the evil into a rejection of it; or if, by eluding that guard, the evil gains admittance into the bowels, it there alſo frequently produces its own remedy, by provoking the inteſtines into a diarrhœa; i. e. that theſe therefore were diſeaſes or reſentments of nature under the ſimpleſt form.

Lastly; We then proceeded to obſerve, that if, from the inſidious and ſubtle nature of the evil, all thoſe teſts are cheated, inſomuch that it paſſes into the more remote receſſes of life; or if, by any means, a removal of the ſeveral original fluids from their own proper receptacles takes place; or a vitious ſtate of them, from external influence or internal cauſes, is produced; we obſerved, I ſay, that even then the conſtitution is not left a defenceleſs prey to any deſtructive agency; but that, in analogy to all the prior means of ſecurity, the internal vaſcular parts of the body, from an equal principle of perception, are neceſſarily and ſucceſſively ſtimulated by the evil itſelf into ſpaſmodic efforts to diſlodge it, which, for the ſame reaſon, continue till it is completely eliminated; and that the aggregate of thoſe efforts form what is called an acute diſeaſe.

Thus we ſee that this ſalutary and efficacious power in animal life, which phyſicians call Nature, is one and the ſame living, perceptive principle, under various modes of operation. By its agency, through the ſeveral modifications of the ſight, ſmell, and taſte, it preſerves the conſtitution from contamination, and ſecures its health; and being equally impreſſed upon the ſtomach, guts, and the internal vaſcular parts of the body, it cures by expelling the evil in the form of diſeaſe.---Reſiding in the ſenſes under the moſt delicate and well-adapted ſpecies of feeling, this principle becomes, from this mode of its operation, a cautionary ſecurity againſt the introduction of miſchief; and, by a groſs and more palpable perception, reſulting from actual contact with the internal and vaſcular parts of the body, the evil is expelled from the animal ſyſtem, when it has gained admittance into it.

FROM this view, therefore, we may venture to give, perhaps with ſome degree of preciſion, a rational and determined idea of Animal Nature, under the following definition, viz.

Nature is a train of neceſſary, and, in ſome meaſure, mechanic conſequences, reſulting from the operation of matter, foreign and external, on the various parts of matter organized, and endowed by animation with ſpecific perceptions.

## FINIS.

## ERRATA.

Page 18, line 3, for *ſtroke*, read *ſtock*.
66, line 3, for *included*, read *including*.
96, line 11, for *impaſſable*, read *impoſſible*.
144, line the laſt, for ʒij. read ℈ij.
159, line the laſt, for *religion*, read *reaſon*.
221, line 5, for *wound*, read *bone*.
231, line 8, dele ; *or*, read *avoided*, *paid* &c.

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